SEED ORCHARDS OF BRITISH COLUMBIA

Province of British Columbia Ministry of Forests

Foreword

I am pleased to present this first Directory of Seed Orchards in British Columbia.

As indicated in the introduction which follows, the purpose of this Directory is to provide - a list of seed orchards,
- a location map of each orchard, and
- seed production experience (to date) and potential.

For each orchard site the respective agency, supervisor's name, mailing address and telephone number(s) have been provided.

Should you wish further information in regard to orchard programs on a zonal or provincial basis an organization chart for the Seed Production Section is provided in Appendix III.

I wish to acknowledge the contribution made by all seed orchard staff and others who provided information and assistance; to Cam Bartram, Seed Production Planning Officer for review and directions; and to Pauline Hanson, Seed Technician, who with much effort and enthusiasm compiled this Directory.

It is planned to update this Directory periodically as needed.
I hope that you find this Directory informative and useful.

C. Johnson
Director
Silviculture Branch

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Introduction

The Seed Orchard program in British Columbia has its foundations in the immense impact of the forest resource on this province. Of B.C.'s total land area, 52.1 million hectares (55%), is classified as productive forest land, and one in four persons are either directly or indirectly employed by the forest industry. Supply forecasts reveal a future timber shortage. An increase in demand for high quality seedlings to reduce this future shortfall has generated intensive efforts into the production of genetically improved seed produced in seed orchards.

The first seed orchard was established on the coast of B.C. in 1963 in Campbell River. Between 1963 and 1979, 25 orchards were established on the coast by government and industry, and with the exception of one sitka spruce orchard and one hemlock orchard, the rest were Douglas-fir.

To improve coordination within the joint government/industry tree improvement projects, two cooperative programs were formed in B.C.; the Coastal Tree Improvement Council (CTIC) to serve the coastal region, and the Interior Tree Improvement Council (ITIC) for the interior region. These councils were formed in 1979 and 1981 respectively to coordinate government and industry projects and are responsible for making recommendations to the provincial Chief Forester regarding program objectives, strategies, agency involvement, and allocation of workload and research needs for future tree improvement in B.C. Companies participating in the management of orchards are reimbursed for costs incurred through credits-to-stumpage under section 88(1) of the Forest Act. The primary tree improvement goal of the councils is to produce sufficient orchard seed for the production of 40 million genetically improved seed on the coastal region, and 80 million in the interior region of B.C. annually by 1995. Today, improved seed from both Ministry and cooperating forest industry seed orchards accounts for about 5% of the seedlings planted under the current reforestation program. As orchards mature seed production will increase.

Private orchards exist as well, to produce seed primarily for private forest lands. These are managed and financed without government support.

Experience revealed that location of seed orchards is of crucial importance in achieving abundant and frequent cone production, and that those areas of summer drought conditions were prime locations for seed orchards. Ten of the initial coastal orchards were not recommended for intensive management under the CTIC and abandoned because they were not located in this favourable environment.

Orchard planning is based on 37 seed orchard planning zones (Figure 1). These boundaries represent a compromise between biogeoclimatic zones and subzone boundaries and administrative boundaries. Each planning zone has a projected long-term seed need based on planting requirements for each species. The 1983 projected annual seedling requirements for the year 2000 and beyond are 35,000,000 seedlings required for the Coast; 125,100,000 seedlings for the Central Interior; and 57,440,000 seedlings for the Southern Interior. As well, site qualities and intensive management potentials in the respective zone determine those species and zones which merit orchard coverage.

The purpose of this directory is to:

- provide a list of BC seed orchards and their respective locations

and - provide a current data base for assessment of seed production potential for domestic forest renewal.

The intended use of this directory is for Ministry of Forests regional and district managers and their staff, and other individuals directly and indirectly interested in the location and features of B.C.'s seed orchard centres.

SEED ORCHARD PLANNING ZONES

COAST

EVI	Eastern Vancouver Island
WVI	Western Vancouver Island
JS	Johnstone Strait
SCM	South Coast Mainland
CIT	Coast Interior Transition
SC	Subcontinental
QCW	Queen Charlotte Islands Wet
QCM	Queen Charlotte Islands Moist
MCM	Mid Coast Moist
MCW	Mid Coast Wet
NCW	North Coast Wet
NCM	North Coast Moist
NST	Nass Skeena Transition
WCC	West Central Coast
NCI	North Coast Islands
NVI	Northern Vancouver Island

CENTRAL INTERIOR

CP	Central Plateau
BLK	Bulkley
NCH	Nechako
MGR	McGregor
CHL	Chilcotin
CT	Cariboo Transition
BB	Big Bar
QL	Quesnel Lakes
MRB	Mt. Robson
HH	Hudson Hope
FIN	Finlay
DK	Dease Klappan
FN	Ft. Nelson
SUS	Sustut

SOUTHERN INTERIOR

WK	West Kootenay
TOD	Thompson Okanagan Dry
SA	Shuswap Adams
TOA	Thompson Okanagan Arid
EK	East Kootenay
MIC	Mica
BSH	Bush

MINISTRY OF FORESTS
Silviculture Branch
Consolidated April 1985

Figure 1

This directory includes information for Ministry of Forests seed orchards, cooperative seed orchards managed by forest companies under Section 88 of the Forest Act and private orchards.

Format

The directory itself is divided into coast and interior, with the listing of orchards alphabetical by location name. A general location map, a site organization map, and a detailed description of each established and producing orchard is compiled for each orchard location. For the MOF and the cooperative orchards, the information provided for each seed orchard is based on registration cards that are submitted as part of a required working plan by the MOF. For the private orchards, information was requested and provided by the companies.

Orchards are classified as developing, established or producing, and are described as follows:

Class Description	Stage of Development Reached
Developing Orchard	Site clearing and preparation and/or propagation underway.
Established Orchard	80%+ planted with orchard stock. If field grafting is to be practiced all tree positions must be occupied by rootstock and at least 80% graft survival must be attained.
Producing Orchard	Orchards that have produced greater than 40% of their annual seed target in any one year.

Orchards that are approved by the MOF and in the planning stages are not included.

The following is a list of species abbreviations included in this directory, with common and scientific names.

Fdc - Douglas-fir (coast)- Pseudotsuga menziesii var. menziesii
Hw - Western hemlock - Tsuga heterophylla
Ss - Sitka spruce - Picea sitchensis
Ba - Amabilis fir - Abies amabilis
Cy - Yellow cedar - Chamaecyparis nootkatensis
Cw - Western red cedar - Thuja plicata
Se - Engelmann spruce - Picea engelmannii
Pli - Lodgepole pine (interior) - Pinus contorta var. latifolia
Sx - Interior spruce (commonly white×engelmann hybrids) Picea sp.

The following orchard definitions are presently in use in British Columbia:

----- (1) Type of Orchard -----

Clonal - contains trees that have originated from vegetative propagation (i.e. either by grafting or rooting)

Seedling - contains trees that have originated from seed.

i) Full-sib - composed of families in which both parents are known (i.e. controlled pollination undertaken prior to establishment).

ii) Half-sib - composed of families in which only a single parent is known (i.e. open or wind pollinated seed collected prior to establishment).

----- (2) Generation of Orchard -----

1.0 generation orchard - clonal or seedling orchard from genetically untested, first generation parent trees selected in natural stands.

1.5 generation orchard - clonal orchard consisting of genetically superior, first generation parent trees, as identified from progeny tests.

1.75 generation orchard - clonal orchard propagated from selections made within provenance tests in which individual families are identified.

2.0 generation orchard - clonal orchard propagated from selections made within full-sib progeny tests of first generation parent trees.

These generation numbers reflect only a ranking of genetic qualities (eg. a 2.0 generation orchard ranks superior to a 1.0 generation orchard) and do not equate to actual genetic gain differences. A clonal 1.0 generation orchard can become a 1.5 generation orchard when trees are rogued (= culled) based on progeny testing.

In general, first generation orchards in British Columbia have been planned to follow the classical approach of clonal orchards using parents selected phenotypically in wild stands at differing levels of intensity. In coastal Douglas-fir appreciation of graft incompatibility and cone production problems early in the program led to a change to the seedling approach. In the future, as progeny test information becomes available, more advanced generations of orchards will be established. Problems of graft incompatibility and poor cone production are being overcome through research support. This will bring about a general return to clonal orchards.

Unless otherwise stated, all orchards listed are first generation orchards (1.0). Note is made of the advanced generation orchards.

Summaries

Table 1 lists 9 species along with their respective orchard hectares. A list of all producing, established and developing orchards, and a list of seed orchard planning zones and their supplying orchards are found in Appendix I and II respectively.

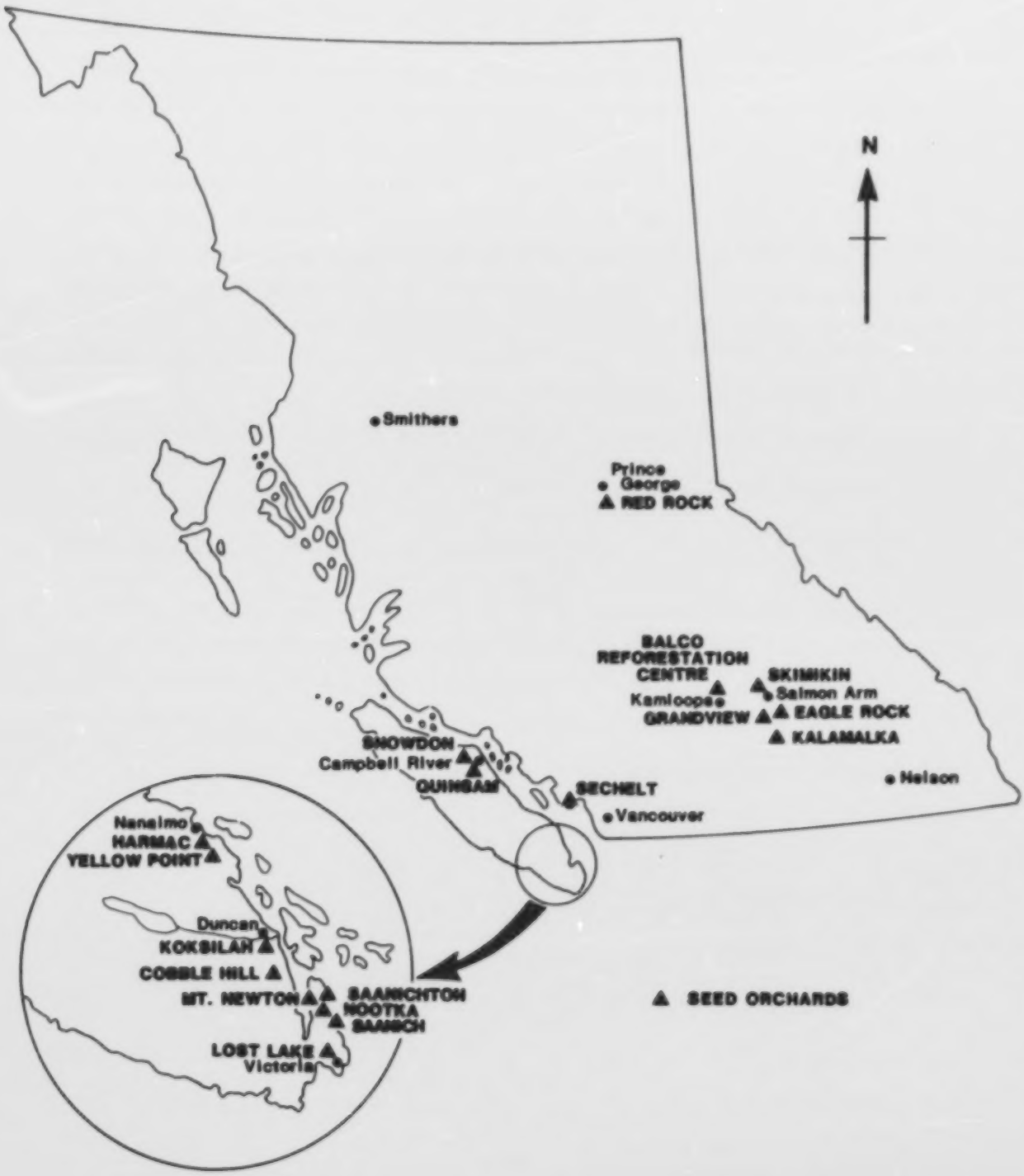
Table 1.

SEED ORCHARD HECTARES BY SPECIES

	Developing	Established	Producing	Totals
Fdc - Douglas-fir (coast)	-	12.43	39.44	51.87
Hw - Western hemlock	11.50	11.97	-	23.47
Ss - Sitka spruce	1.35	2.30	1.29	4.94
Ba - Amabilis fir	12.55	-	-	12.55
Cy - Yellow cedar	1.02	1.12	-	2.14
Cw - Western red cedar	1.58	1.61	-	3.19
Se - Engelmann spruce	3.03	-	-	3.03
Pli - Lodgepole pine[1]	6.15	-	-	6.15
Pli - Lodgepole pine (interior)	13.60	14.67	-	28.27
Sx - Interior Spruce	21.90	29.16	-	51.06
Totals	72.73	73.26	40.73	186.67

[1]Coast-Interior Transition Zone

Figure 2 **LOCATION OF SEED ORCHARDS IN BRITISH COLUMBIA**



COASTAL SEED ORCHARDS

CAMPBELL RIVER — Ministry of Forests

COBBLE HILL — Ministry of Forests

HARMAC — MacMillan Bloedel (Private)

KOKSILAH — Ministry of Forests

LOST LAKE — Western Forest Products

MOUNT NEWTON — B.C. Forest Products / Crown Forest Industries

NOOTKA — CIP Forest Products Inc. Tahsis Pacific Region

SAANICH — Ministry of Forests

SAANICHTON — CIP Forest Products Inc. Tahsis Pacific Region (Private)

SECHELT — Canadian Forest Products

YELLOW POINT — MacMillan Bloedel

CAMPBELL RIVER SEED ORCHARDS

Location: Campbell River

Agency:

Ministry of Forests

Province of
British Columbia

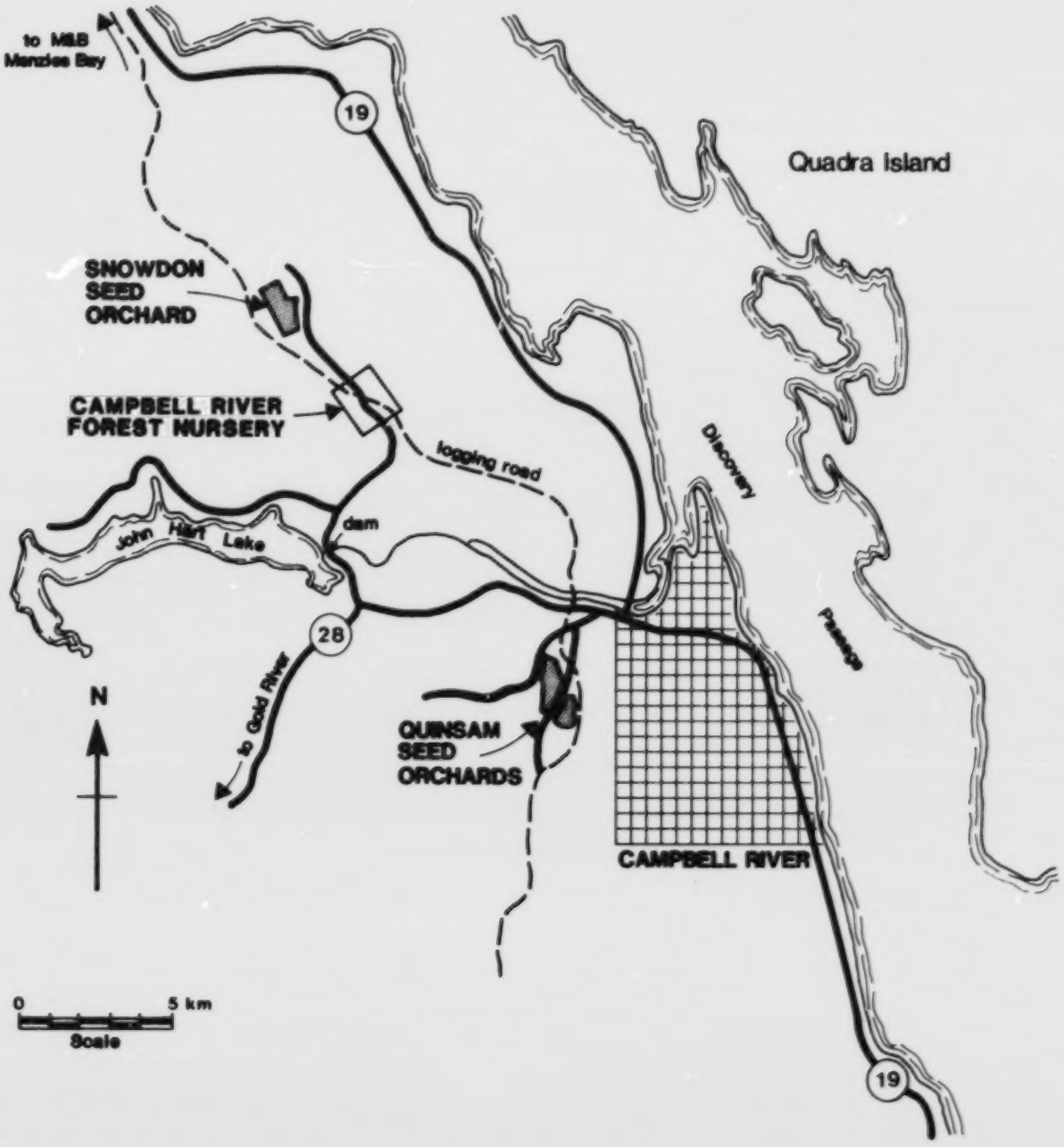
Mailing Address:

Supervisor: Tim Crowder
Campbell River Nursery
Box 25
Campbell River, B.C. V9W 4Z9
Phone Number: (604) 287-4531
or 287-8484

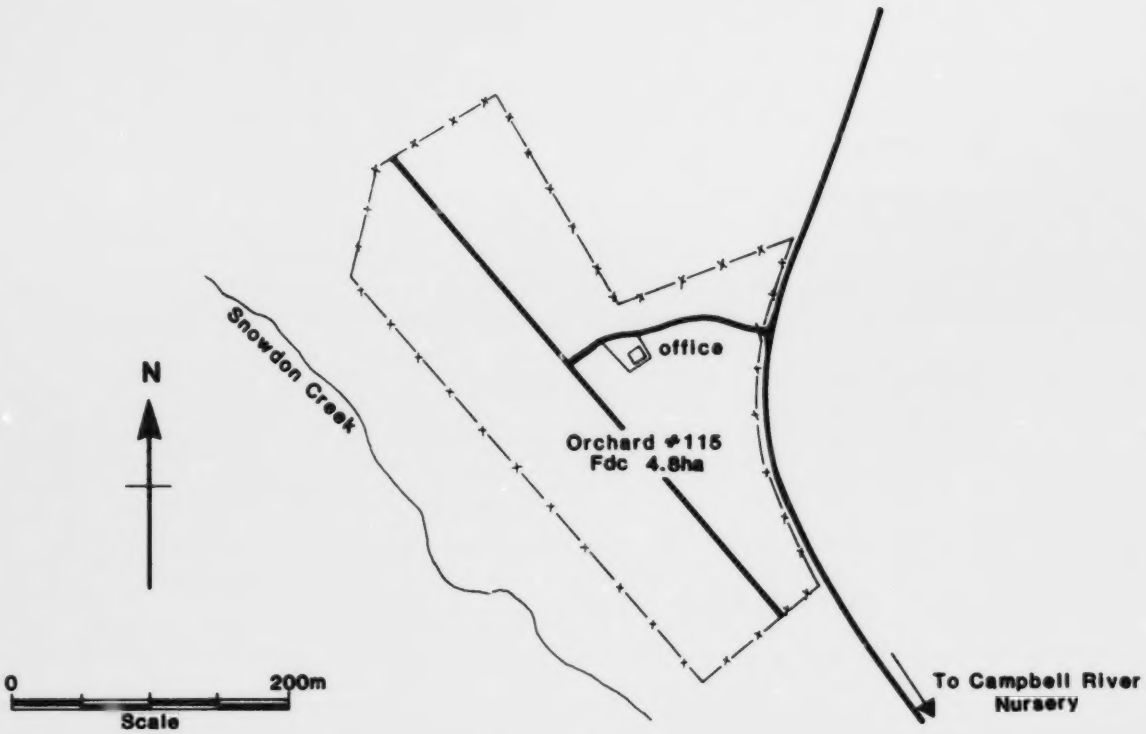
ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- PRODUCING ORCHARDS -----			
101	Quinsam	1963	Fdc	EVI	6.6
115	Snowdon	1971	Fdc	JS	4.8
				Total	11.4
		----- DEVELOPING ORCHARDS -----			
143	South Quinsam	1986/88	Hw	(JS)(SCM)	3.8

GENERAL LOCATION OF CAMPBELL RIVER SEED ORCHARDS

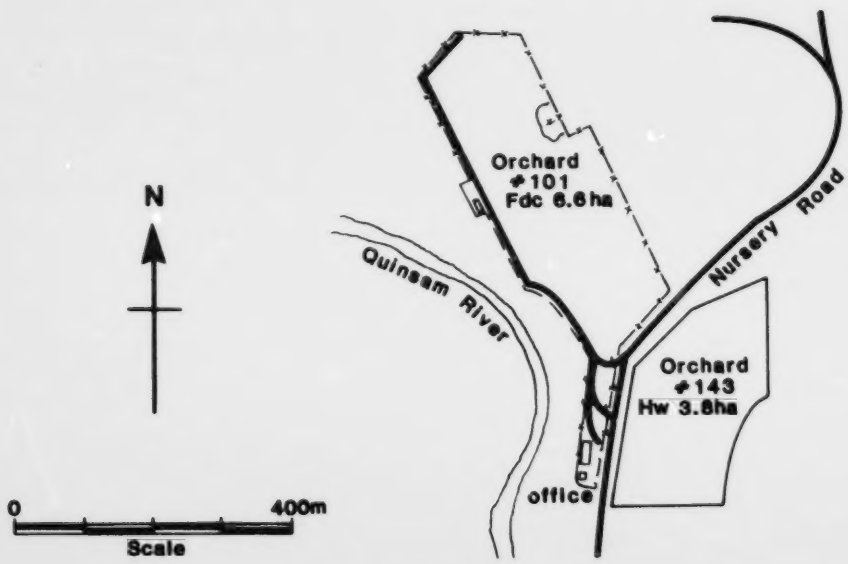


SITE ORGANIZATION SHOWING CAMPBELL RIVER ORCHARD LOCATIONS



SNOWDON SEED ORCHARD

QUINSAM SEED ORCHARDS



QUINSAM ORCHARD (#101)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zone: EVI

For Elevational Range: 300 to 700 m

Estimated total seed needs for the zonal elevation band 11.66 kg/annum
Predicted yield: This orchard 51.42 kg/annum Surplus: 39.76 kg

Size: Total area 9.3 ha Orchard area 6.6 ha

Design: Modified random block design. All blocks randomized individually so that the same ramets/siblings are not immediately adjacent.
Number of Parents: 69 (23G, 19OP, 5CP, 22 G+OP)
Number of seedlings/ramets at initial spacing 6.7 m x 3.8 m = 3058
Planned for the orchard at final spacing 6.7 m x 7.6 m = 1529*
Number of individual seedlings/ramets in the orchard at revision date 1362
Dates established 1963-Date Phase out date 1995
Type of Orchard/Seed Class: Combined Clonal/Full Sib/O.P.

Tie In With Breeding Program: Yes. 53 parents in breeding program. Approximately 25% culling expected. Limited improvement through pollen management.

*Does not allow for culling on a genetic basis.

SNOWDON ORCHARD (#115)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zone: JS

For Elevational Range: 0 to 450 m

Estimated total seed needs for the zonal elevation band 20.98 kg/annum
Predicted yield: This orchard 43.87kg/annum Surplus: 22.89 kgs

Size: Total area 5.5 ha Orchard area 4.8 ha

Design: Modified random block design - all blocks randomized individually so that ramets/siblings are not immediately adjacent.
Number of Parents: 72 (37c, 26f and 9 prov.)
Number of seedlings/ramets at initial spacing 3.8 m x 6.7 m = 1882
Planned for the orchard at final spacing 7.6 m x 6.7 m = 941
Number of individual seedlings/ramets in the orchard at revision date 1074
Date established 1971 Phase out date 1990
Type of Orchard/Seed Class: Combined Clonal/Full Sib/O.P.

Tie In With Breeding Program: Yes. 30 parents are in breeding program. The choice of pollen applied will follow the breeding program.

COBBLE HILL SEED ORCHARD

Location: Cobble Hill, 7.5 km south of Duncan

Agency:

Ministry of Forests

Province of
British Columbia

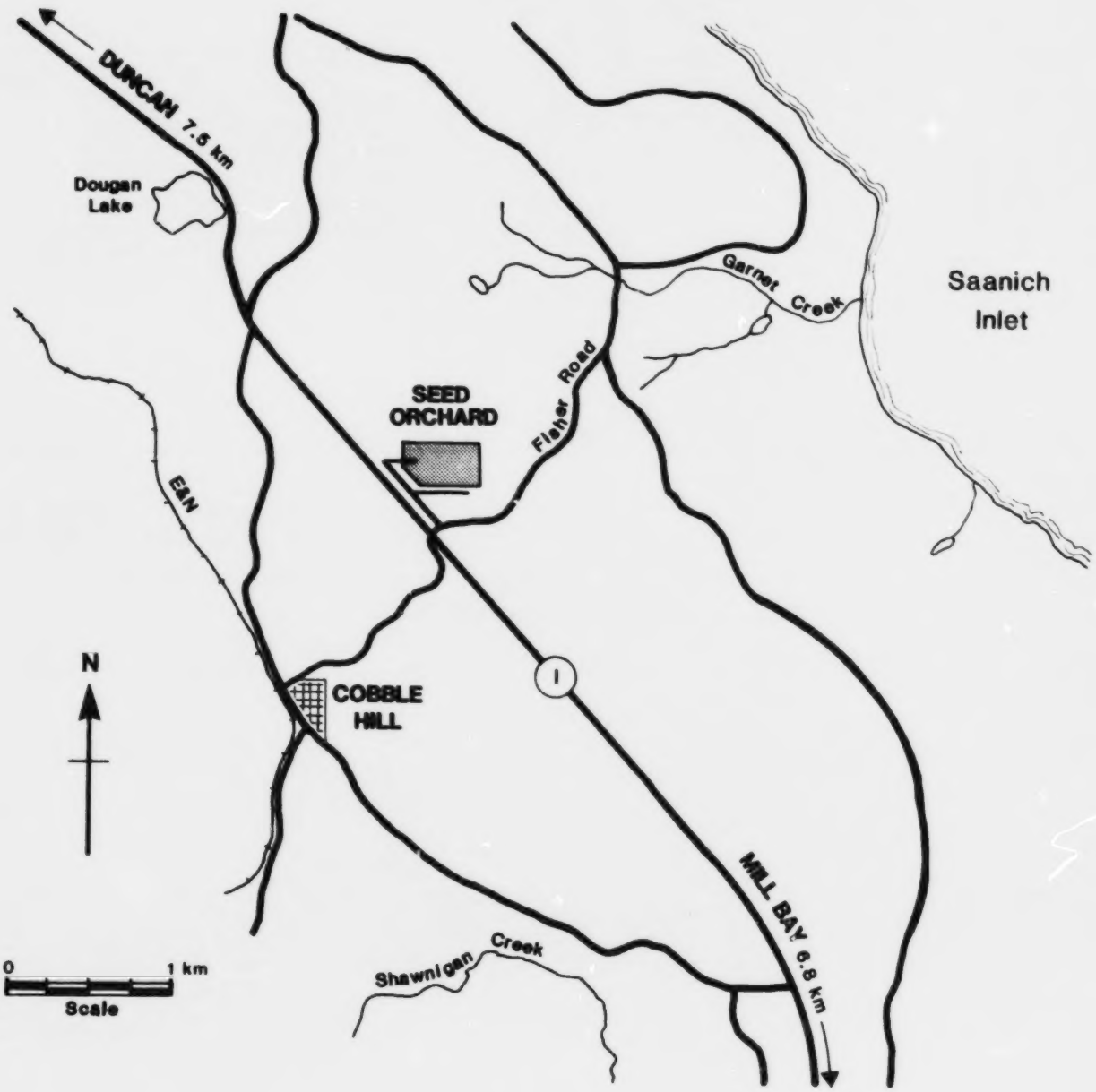
Mailing Address:

Supervisor: Dan Rudolph
Cobble Hill Seed Orchard
Ministry of Forests
Box 816
Duncan, B.C. V9L 3Y2
Phone Number: (604) 746-6411
or 748-2144

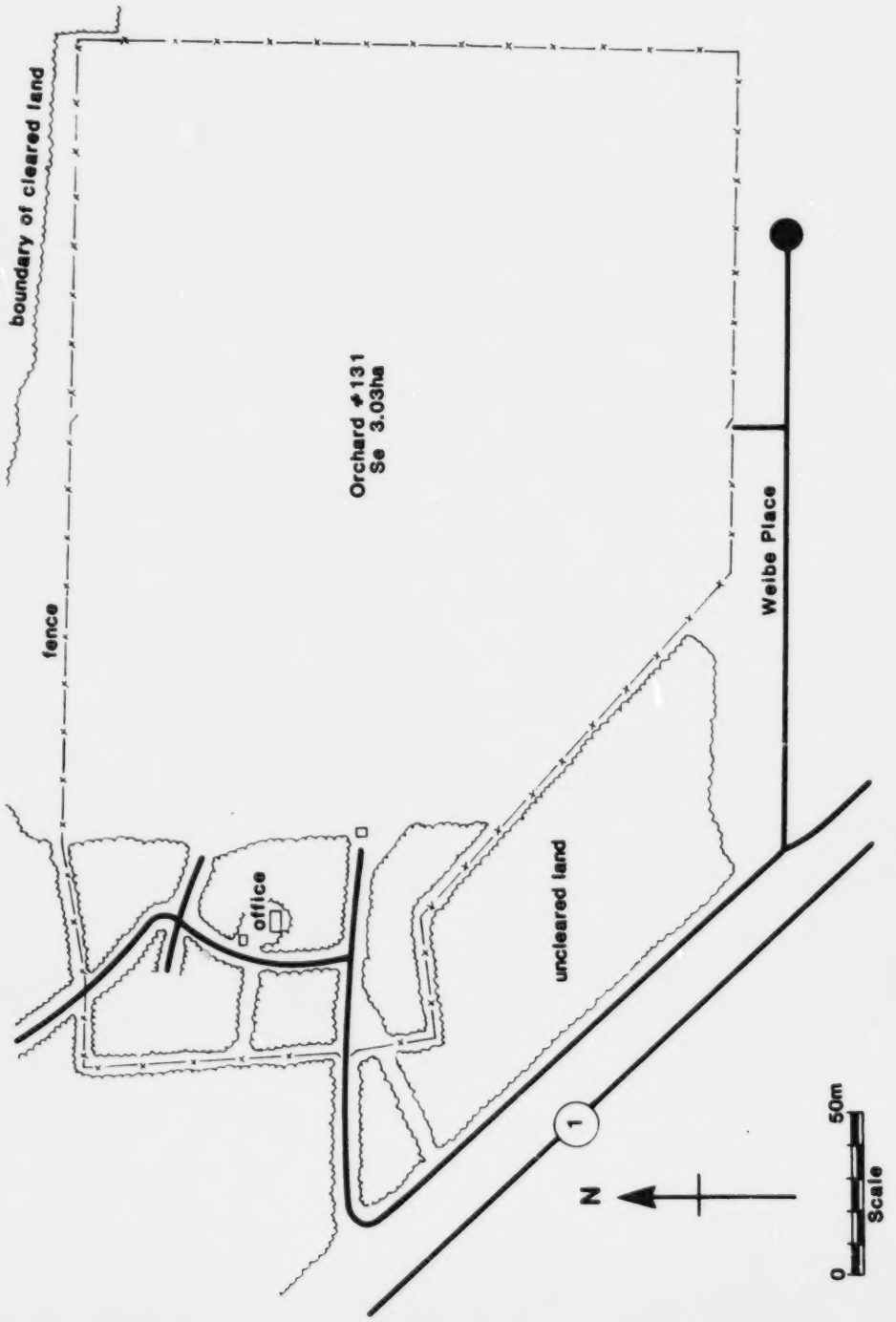
ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- DEVELOPING ORCHARDS -----			
131	Cobble Hill	1985/86	Se	CIT (SC)	3.03

GENERAL LOCATION OF COBBLE HILL SEED ORCHARD



SITE ORGANIZATION SHOWING COBBLE HILL ORCHARD LOCATIONS



HARMAC SEED ORCHARDS

Location: Harmac Tree Improvement Centre, South of Nanaimo

Agency:

MacMillan Bloedel Ltd.

Mailing Address:

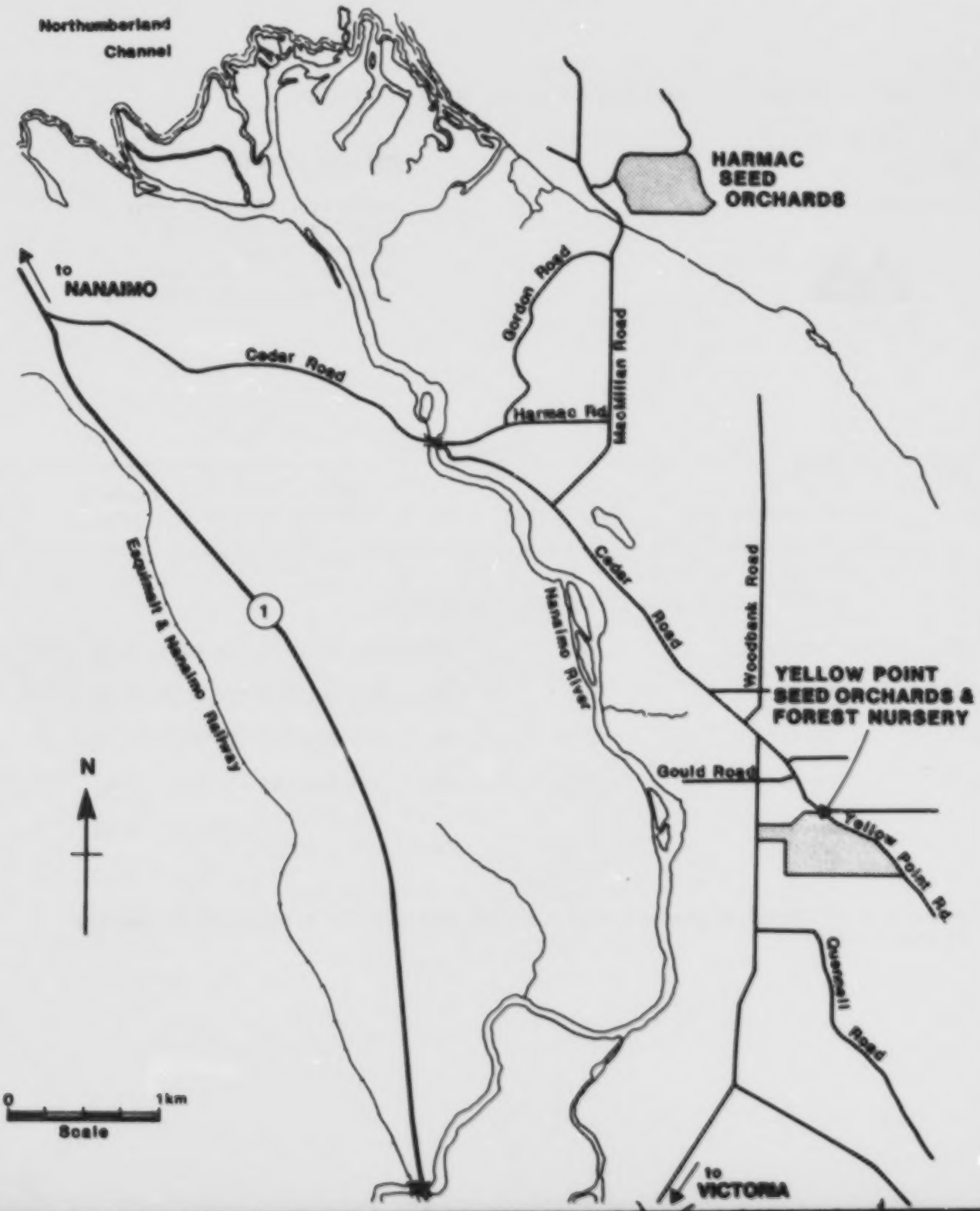
Supervisor: Phyllis Harvey
MacMillan Bloedel Ltd.
65 Front Street
Nanaimo, B.C. V9R 5H9
Phone Number: (604)753-1112

ORCHARD SUMMARY

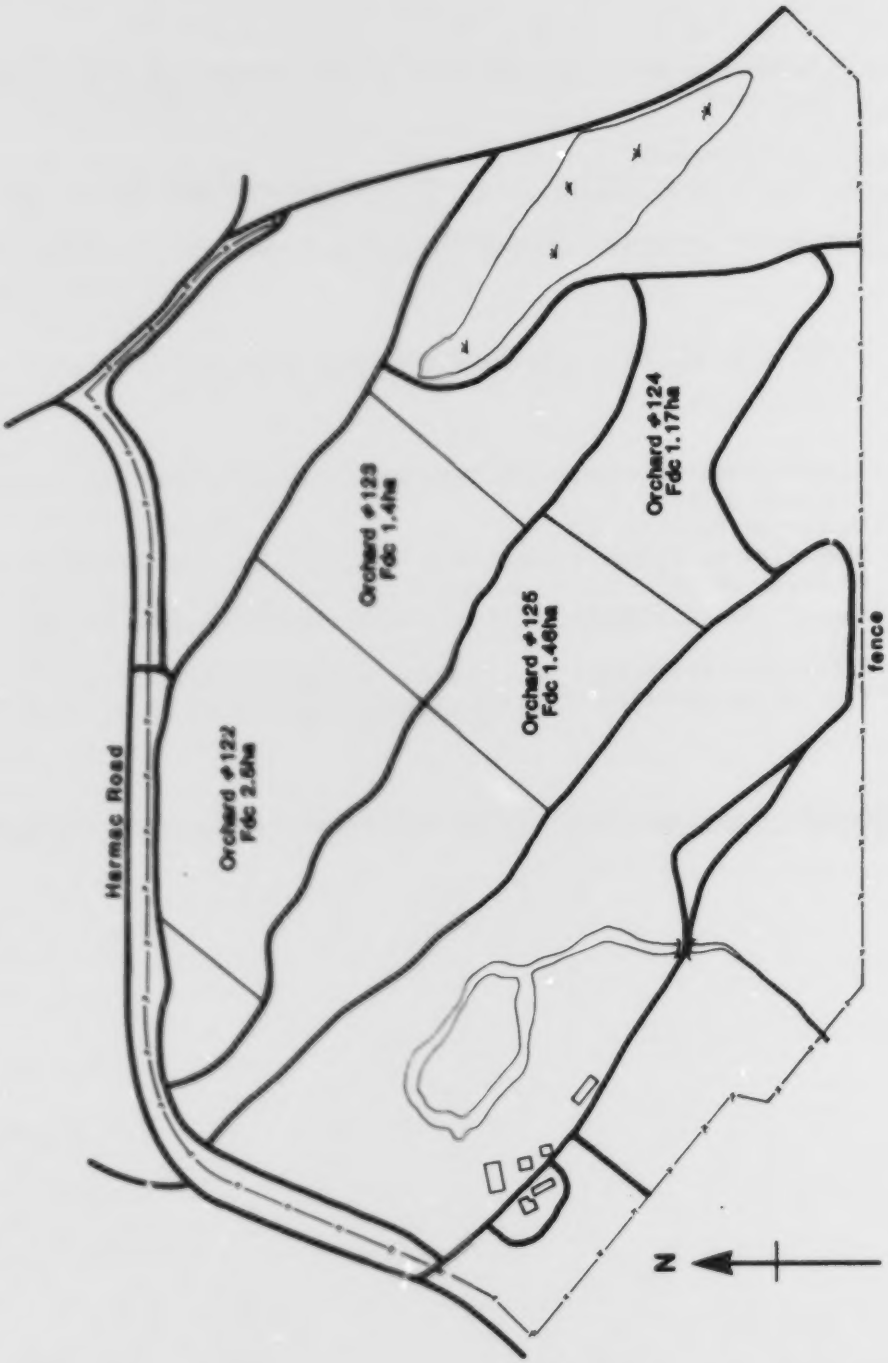
Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha.
		----- ESTABLISHED ORCHARDS -----			
122	Harmac	1977	Fdc	Dry Douglas-fir BGC*	2.50
123	Harmac	1977	Fdc	Wet Douglas-fir BGC*	1.40
124	Harmac	1979	Fdc	Dry Douglas-fir BGC*	1.17
125	Harmac	1979	Fdc	Wet Douglas-fir BGC*	1.46
				Total	6.53

*Orchard is not based on seed orchard planning zones, but a biogeoclimatic subzone of Douglas-fir.

GENERAL LOCATION OF HARMAC AND YELLOW POINT SEED ORCHARDS



SITE ORGANIZATION SHOWING HARMAC ORCHARD LOCATIONS



HARMAC ORCHARD (#122)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: Dry Douglas-fir BGC

For Elevational Range: 301 to 600 m

Estimated seed yield at Age 15: 9.9 kg/annum

Size: Total area 2.5 ha Orchard area 2.5 ha

Design: Random, restricted so that two rows or columns are between ramets of the same clone.
Number of Parents: 67
Number of seedlings/ramets at initial spacing 7.3 m x 7.3 m = 303
Planned for the orchard at final spacing 7.3 m x 7.3 m = 303
Number of individual seedlings/ramets in the orchard at revision date 303
Date established 1977 Phase out date 1997
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. MB has initiated a progeny testing program.

HARMAC ORCHARD (#123)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: Wet Douglas-fir BGC For Elevational Range: 300 to 600 m

Estimated seed yield at Age 15: 5.3 kg/annum

Size: Total area 1.4 ha Orchard area 1.4 ha

Design: Random, restricted so that two rows or columns are between ramets of the same clone.
Number of Parents: 35
Number of seedlings/ramets at initial spacing 7.3 m x 7.3 m = 163
Planned for the orchard at final spacing 7.3 m x 7.3 m = 163
Number of individual seedlings/ramets in the orchard at revision date 163
Date established 1977 Phase out date 1997
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. MB has initiated a progeny testing program.

HARMAC ORCHARD (#124)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: Dry Douglas-fir BGC
For Elevational Range: 0 to 300 m

Estimated seed yield at Age 15: 8.75 kg/annum

Size: Total area 1.17 ha Orchard area 1.17 ha

Design: Random, restricted so that two rows or columns are between ramets of the same clone.
Number of Parents: 48
Number of seedlings/ramets at initial spacing 7.3 m x 7.3 m = 268
Planned for the orchard at final spacing 7.3 m x 7.3 m = 268
Number of individual seedlings/ramets in the orchard at revision date 268
Date established 1979 Phase out date 1999
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. MB has initiated a progeny testing program.

HARMAC ORCHARD (#125)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: Wet Douglas-fir BGC For Elevational Range: 0 to 300 m

Estimated seed yield at Age 15: 8.9 kg/annum

Size: Total area 1.46 ha Orchard area 1.46 ha

Design: Random, restricted so that two rows or columns are between ramets of the same clone.
Number of Parents: 48
Number of seedlings/ramets at initial spacing 7.3 m x 7.3 m = 273
Planned for the orchard at final spacing 7.3 m x 7.3 m = 273
Number of individual seedlings/ramets in the orchard at revision date 273
Date established 1979 Phase out date 1999
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. MB has initiated a progeny testing program.

KOKSILAH SEED ORCHARD

Location: Duncan

Agency:

Ministry of Forests

Province of
British Columbia

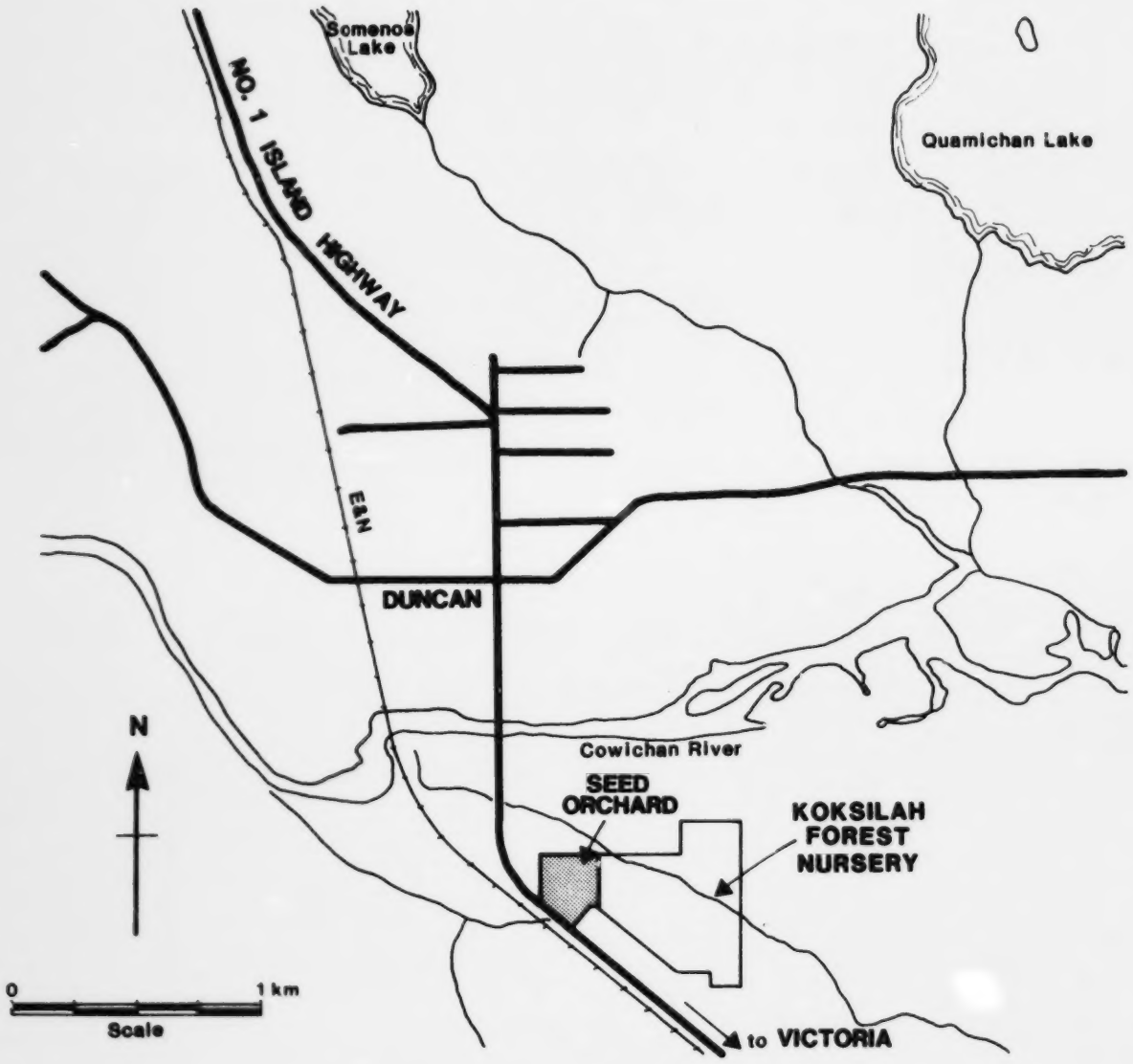
Mailing Address:

Supervisor: Dan Rudolph
Koksilah Seed Orchard
Ministry of Forests
P.O. Box 816
Duncan, B.C. V9L 3Y2

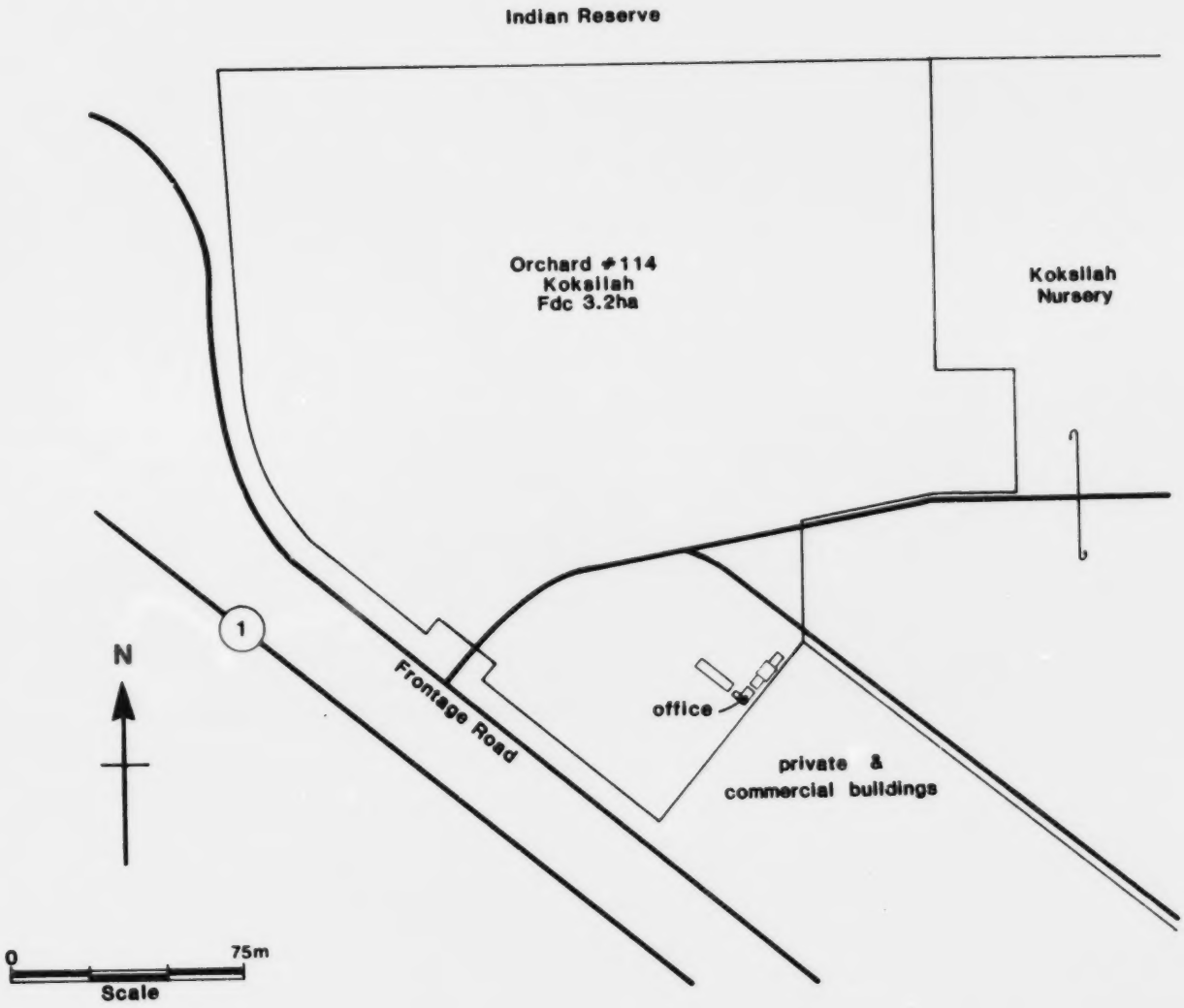
ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- PRODUCING ORCHARDS -----			
114	Koksilah	1970	Fdc	SCM (CIT)	3.2

GENERAL LOCATION OF KOKSILAH SEED ORCHARD



SITE ORGANIZATION SHOWING KOKSILAH ORCHARD LOCATIONS



KOKSILAH ORCHARD (#114)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: SCM (CIT)

For Elevational Range: SCM 305, CIT 350 to 922, 755 m

Estimated total seed needs for the zonal elevation band 31.51 kg/annum
Predicted yield: This orchard 36.15 kg/annum Surplus: 4.64 kg

Size: Total area 3.6 ha Orchard area 3.2 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 50
Number of seedlings/ramets at initial spacing 6.7 m x 3.8 m = 1254
Planned for the orchard at final spacing 6.7 m x 7.6 m = 627
Number of individual seedlings/ramets in the orchard at revision date 541
Dates established 1970-1972 Phase out date 2001
Type of Orchard/Seed Class: O.P. Seedling

Tie In With Breeding Program: Yes. 27 of the 50 O.P. seedling parents are in the breeding program. Limited improvement using pollen management.

LOST LAKE SEED ORCHARDS

Location: Saanich

Agency:

Western Forest Products Ltd.

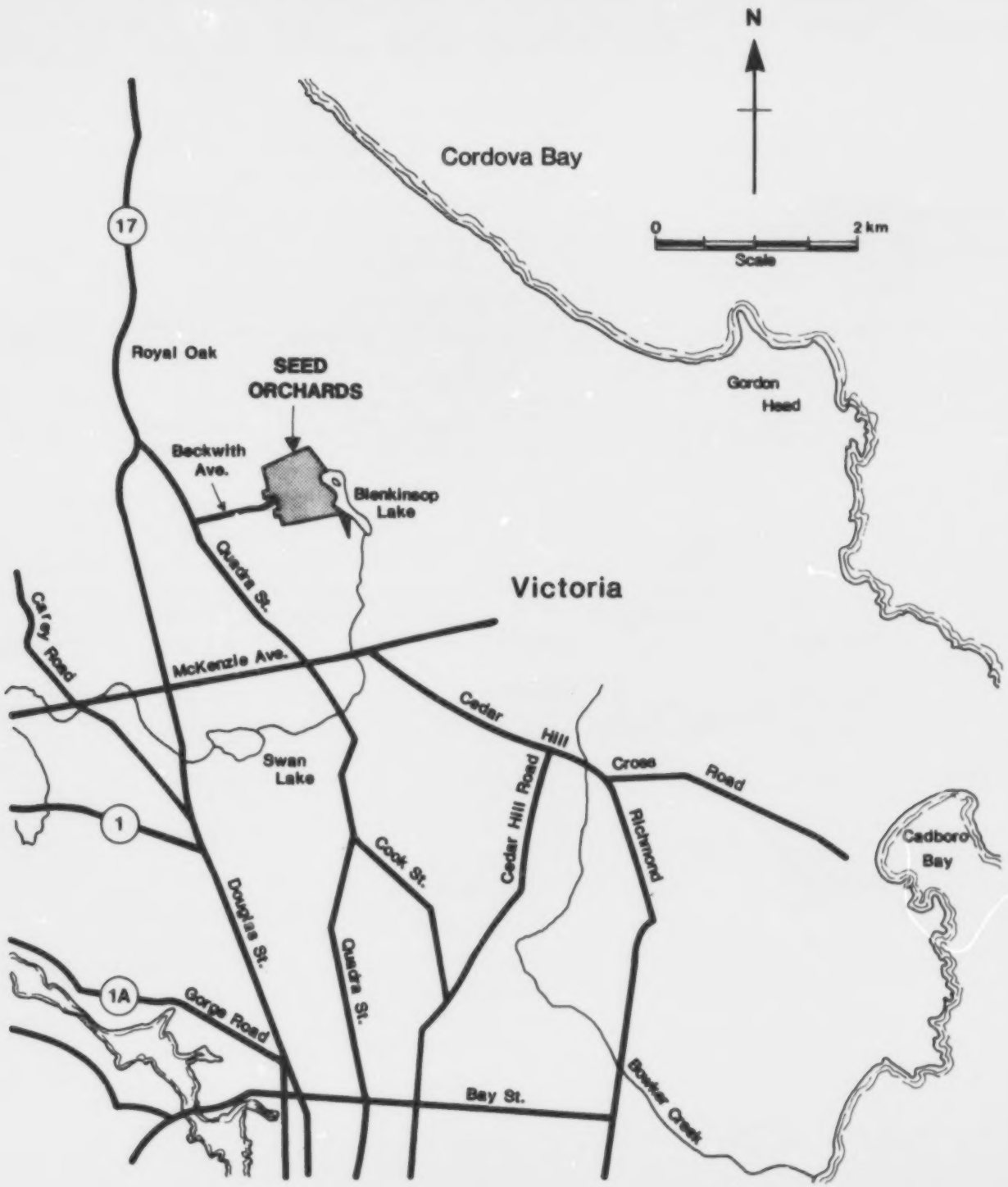
Mailing Address:

Supervisor: Roy Collins
1020 Beckwith Ave.
Victoria, B.C. V8X 3S4
Phone Number: (604) 479-4911

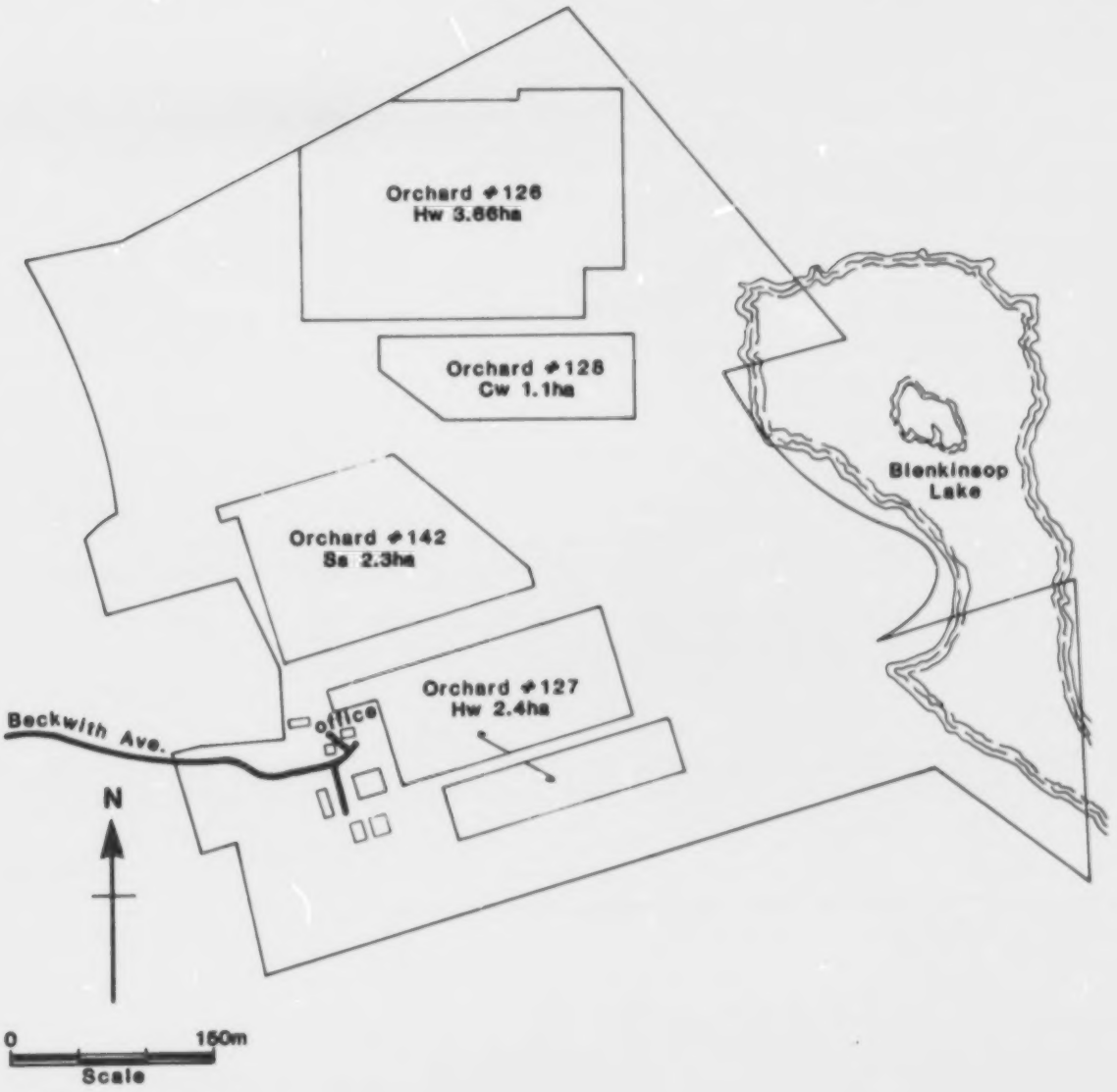
ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- ESTABLISHED ORCHARDS -----			
126	Lost Lake	1979/84	Hw	NVI/WCC	3.66
127	Lost Lake	1979/84	Hw	NVI/WCC	2.40
128	Lost Lake	1980/84	Cw	NVI/WCC	1.10
142	Lost Lake	1979/84	Ss	QCI	2.30
				Total	9.46

GENERAL LOCATION OF LOST LAKE SEED ORCHARDS



SITE ORGANIZATION SHOWING LOST LAKE ORCHARD LOCATIONS



LOST LAKE ORCHARD (#126)

Species: Western hemlock

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: NVI/WCC

For Elevational Range: 0 to 450 m

Estimated seed yield at Age 12: 2.965 kg/annum
Estimated total seed needs for the zonal elevation band 2.965 kg/annum
Orchard Targets: This orchard is designed to produce the total seed needs for N.V.I./W.C.C. Seed Orchard planning zone. (Prince Rupert District requirements are only estimated at 100,000 seedlings).

Size: Total area 4.19 ha Orchard area 3.66 ha

Design: Random block and designed for one systematic thinning when necessary. (B.C.F.S. double overlay design)
Number of Parents: 90
Number of seedlings/ramets at initial spacing 2.4 m x 7.3 m = 2096
Planned for the orchard at final spacing 4.9 m x 7.3 m = 1048*
Number of individual seedlings/ramets in the orchard at revision date 948
Dates established 1979-1984 Phase out date 2015
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Culling to be based on results from either open or controlled cross progeny test. (B.C. Ministry of Forests Program).

*Does not allow for culling based on Progeny test results

LOST LAKE ORCHARD (#127)

Species: Western hemlock

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: N.V.I/W.C.C.

For Elevational Range: 450 to 900 m

Estimated seed yield at Age 12: 1.814 kg/annum
Estimated total seed needs for the zonal elevation band 1.814 kg/annum
Orchard Targets: This orchard is designed to produce the total seed needs for N.V.I./W.C.C. Seed Orchard Planning Zone. (Prince Rupert District requirements are only estimated at 100,000 seedlings).

Size: Total area 2.63 ha Orchard area 2.40 ha

Design: Random block and designed for one systematic thinning when necessary. (B.C.F.S. double overlay design)
Number of Parents: 56
Number of seedlings/ramets at initial spacing 2.4 m x 7.3 m = 1228
Planned for the orchard at final spacing 4.9 m x 7.3 m = 614
Number of individual seedlings/ramets in the orchard at revision date 711
Dates established 1979-1984 Phase out date 2015
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Culling to be based on results from either open or controlled cross progeny test. (B.C. Ministry of Forests Program).

LOST LAKE ORCHARD (#128)

Species: Western red cedar

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: N.V.I/W.C.C.

For Elevational Range: 0 to 600 m

Estimated seed yield at Age 12: 0.897 kg/annum
Estimated total seed needs for the zonal elevation band 0.897 kg/annum
Orchard Targets: This orchard is designed to produce the total seed needs for N.V.I./W.C.C. Seed Orchard Planning Zone.
NOTE: Rayonier to manage independent back up of 0.58 ha.

Size: Total area 1.34 ha Orchard area 1.10 ha

Design: Random block and designed for one systematic thinning when necessary. (B.C.F.S. double overlay design)
Number of Parents: 81
Number of seedlings/ramets at initial spacing 2.4 m x 7.3 m = 528
Planned for the orchard at final spacing 4.9 m x 7.3 m = 264
Number of individual seedlings/ramets in the orchard at revision date 400
Dates established 1980/1984 Phase out date 2015
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: No. No breeding programs in B.C. to date.

LOST LAKE ORCHARD (#142)

Species: Sitka spruce

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zone: Q.C.I.

For Elevational Range: 0 to 450 m

Estimated seed yield at Age 12: 3.45 kg/annum
Estimated total seed needs for the zonal elevation band 3.45 kg/annum
Orchard Targets: This orchard is designed to produce the total seed needs for the Q.C.I. Seed Orchard Planning Zone.

Size: Total area 2.69 ha Orchard area 2.30 ha

Design: Random block and designed for one systematic thinning when necessary. (B.C.F.S. double overlay design)
Number of Parents: 90
Number of seedlings/ramets at initial spacing 2.4 m x 7.3 m = 1322
Planned for the orchard at final spacing 4.9 m x 7.3 m = 661
Number of individual seedlings/ramets in the orchard at revision date 680
Dates established 1979/1984 Phase out date 2015
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: No.

MOUNT NEWTON SEED ORCHARDS

Location: Saanichton

Agencies:

British Columbia Forest Products Ltd.
/Crown Forest Industries Ltd.

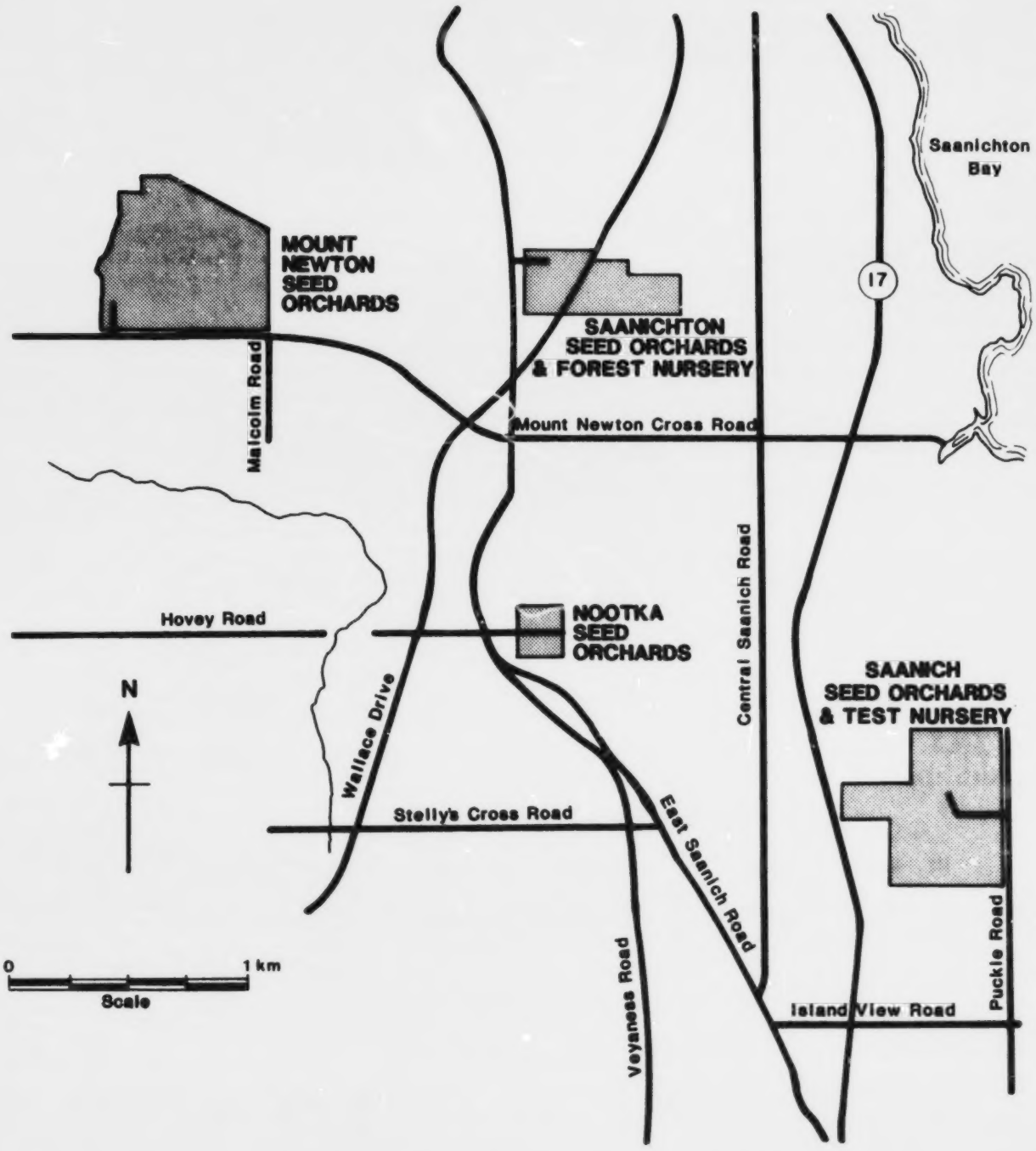
Mailing Address:

Supervisor: Steve Lord
1450 Mt. Newton Cross Rd.
RR. #2
Saanichton, B.C. V0S 1M0
Phone Number: (604) 652-4211

ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- ESTABLISHED ORCHARDS -----			
134	Mt. Newton - CFI	1982/83	Fdc	JS	4.9
138	Mt. Newton - CFI	1983	Cy	WVI/EVI/JS	1.12
140	Mt. Newton - CFI	1983/84	Cw	EVI/SCM/JS	.51
				Total	6.53
		----- DEVELOPING ORCHARDS -----			
129	Mt. Newton - BCFP	1984/85	Ba	(WVI/JS)	7.4
130	Mt. Newton - BCFP	1986/87	Hw	WVI	7.7
				Total	15.1

GENERAL LOCATION OF CENTRAL SAANICH SEED ORCHARDS



SITE ORGANIZATION SHOWING MOUNT NEWTON ORCHARD LOCATIONS

MOUNT NEWTON ORCHARD - CFI (#134)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zone: JS

For Elevational Range: 0 to 450 m

Estimated seed yield at Age 15: 19.58 kg/annum
Estimated total seed needs for the zonal elevation band 20.98 kg/annum
(Snowdon will phase out as #134 develops)

Size: Total area 5.2 ha Orchard area 4.9 ha

Design: Permutated with overlay to permit systematic thinning of 50%. Roguing of 20% age 15-20.
Number of Parents: 80
Number of seedlings/ramets at initial spacing 4 m x 8 m = 1500
Planned for the orchard at final spacing 9 m x 9 m = 600
Number of individual seedlings/ramets in the orchard at revision date 738
Dates established 1982/83 Phase out date 2015
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. 38 clones under test by 1982.

MOUNT NEWTON ORCHARD - CFI (#138)

Species: Yellow cedar

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: WVI/EVI/JS

For Elevational Range: 600 to 1000 m

Estimated seed yield at Age 7: 3.36 kg/annum
Estimated total seed needs for the zonal elevation band 3.36 kg/annum

Size: Total area 1.21 ha Orchard area 1.12 ha

Design: Permutated with initial and final spacing of 5 x 5 meters, no thinning, no roguing. Supplemental pollination is planned due to small orchard area.
Number of Parents: 120
Number of seedlings/ramets at initial spacing 5 m x 5 m = 448
Planned for the orchard at final spacing 5 m x 5 m = 448
Number of individual seedlings/ramets in the orchard at revision date 448
Date established 1985 Phase out date 2025
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: No.

MOUNT NEWTON ORCHARD - CFI (#140)

Species: Western red cedar

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: EVI/SCM/JS

For Elevational Range: 0 to 450 m

Estimated seed yield at Age 7: 0.47 kg/annum
Estimated total seed needs for the zonal elevation band 0.47 kg/annum

Size: Total area 0.6 ha Orchard area 0.51 ha

Design: Permutated with initial and final spacing of 6 x 6 meters, no thinning, no roguing. Supplemental pollination is planned due to small orchard area.
Number of Parents: 100
Number of seedlings/ramets at initial spacing 6 m x 6 m = 140
Planned for the orchard at final spacing 6 m x 6 m = 140
Number of individual seedlings/ramets in the orchard at revision date N/A
Dates established 1983/84 Phase out date 2013
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: No. No thinning, no culling.

NOOTKA SEED ORCHARDS (formerly Hovey Road)

Location: Saanichton

Agency:

C.I.P. Forest Products Inc.
Tahsis Pacific Region

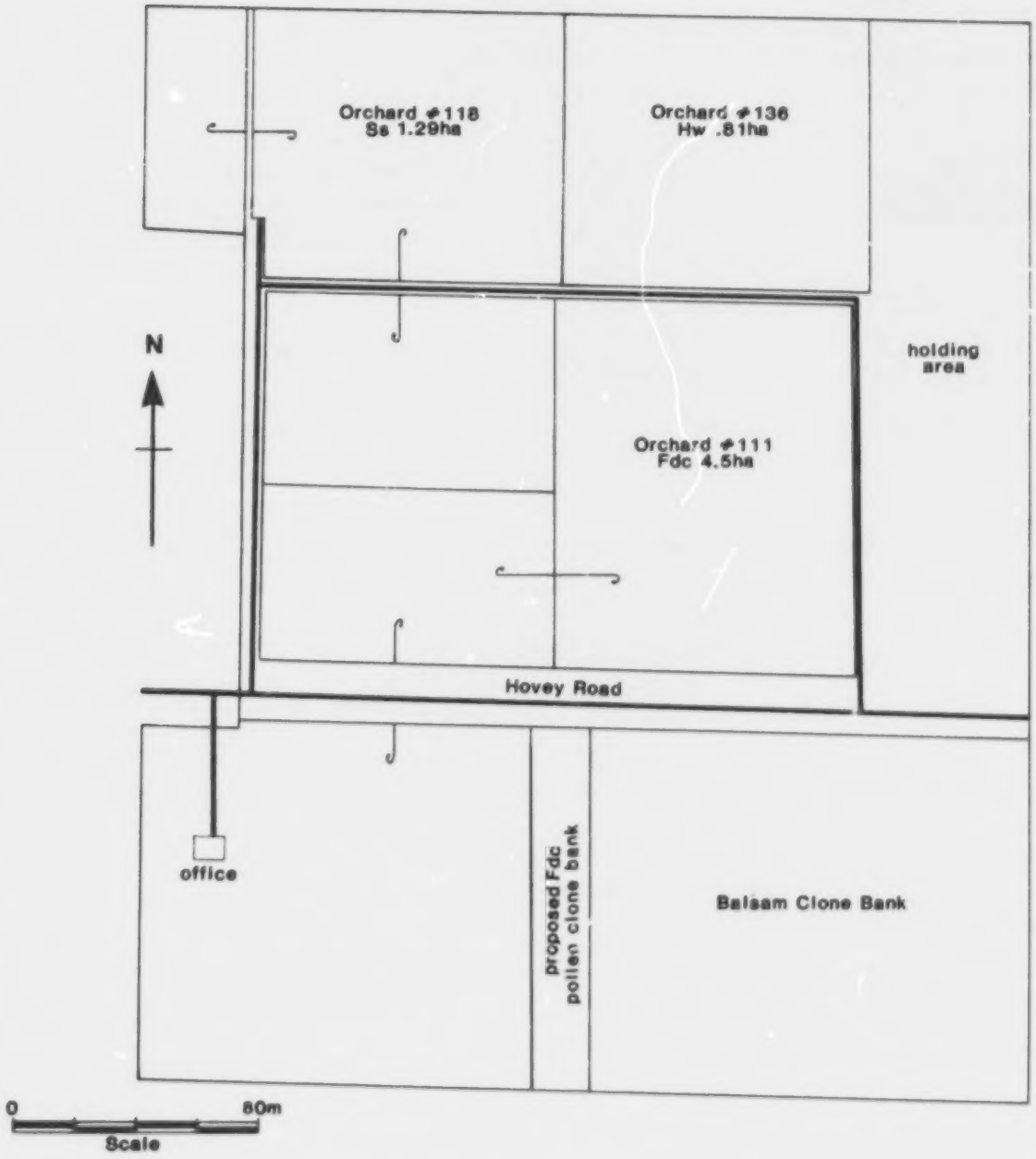
Mailing Address:

Supervisor: Vlad Korelus, R.P.F.
C.I.P. Forest Products Inc.
Tahsis Pacific Region
RR#1, 8067 East Saanich Rd.
Saanichton, B.C. V0S 1M0
Phone Number: (604) 652-4023
or 652-3013

ORCHARD SUMMARY

Seed Orchard	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- PRODUCING ORCHARDS -----			
111	Nootka	1969/75	Fdc	WVI	4.50
118	Nootka	1971/77	Ss	WVI/NVI	1.29
				Total	5.79
		----- ESTABLISHED ORCHARDS -----			
136	Nootka	1977/80	Hw	WVI	0.81

SITE ORGANIZATION SHOWING NOOTKA ORCHARD LOCATIONS



For general location map see "General location of Central Saanich Seed Orchards" page 42

NOOTKA ORCHARD (#111)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zone: WVI

For Elevational Range: 0 to 610 m

Estimated total seed needs for the zonal elevation band 24.63 kg/annum
Predicted yield: This orchard 28.00 kg/annum Surplus: 3.37 kg

Size: Total area 4.68 ha Orchard area 4.50 ha

Design: All clonal and seedling mixture with 52 established clones and A 68 clone pollen bank including 20 Washington parents. Conversion from 6 tree row-plots to single tree mix to be completed.
Number of Parents: 120 families/61 cl
Number of seedlings/ramets at initial spacing - m x - m = -
Planned for the orchard at final spacing 6 m x 6 m = 834 or 858
Number of individual seedlings/ramets in the orchard at revision date 288/1020 = 1308
Dates established 1968-75 (average 1970) Phase out date 1995-2005
Type of Orchard/Seed Class: Combined Clonal/Full Sib/O.P.

Tie In With Breeding Program: Yes. B.C. Forest Service Research Div. progeny test include most parent trees in full sibling crosses. Assessments are also based on provenance study EP 599.

NOOTKA ORCHARD (#118)

Species: Sitka Spruce

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: WVI/NVI

For Elevational Range: 0 to 450 m

Estimated seed yield at Age 10: 3.78 kg/annum
Estimated total seed needs for the zonal elevation band 3.78 kg/annum
Orchard Targets: This orchard is being designed to produce the total seed need for WVI and NVI. A small private orchard is being established for NVI region by Western Forest Products.

Size: Total area 1.56 ha Orchard area 1.29 ha

Design: Randomized 5-tree clonal rows. Since 1974, all planting has been designed to break up clonal rows and approach a modified, random single tree mix.
Number of Parents: 141
Number of seedlings/ramets at initial spacing 3.05 m x 3.05 m = 1418
Planned for the orchard at final spacing 3.05 m x 6.10 m = 709
Number of individual seedlings/ramets in the orchard at revision date 951
Dates established 1971-1977 Phase out date 50% to be completely phased out in 2005

Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. CIP progeny test 19-016, Nootka Island and BCFS Head Bay, testing 40 orchard parent trees. A regional breeding program is needed now. Limited roguing (10%) based on the above.

NOOTKA ORCHARD (#136)

Species: Western Hemlock

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zone: WVI

For Elevational Range: 0 to 450 m

Estimated seed yield at Age 12: 1.320 kg/annum
Estimated total seed needs for the zonal elevation band 5.282 kg/annum
Orchard Targets: This orchard is to supply 35% of the seed need (1.320 kg) and have a northern bias in parent trees. Orchard #132 is to supply 75% and is to have a southern bias in parent trees.

Size: Total area 0.87 ha Orchard area 0.81 ha

Design: Modified random single tree mix.
Number of Parents: 96
Number of seedlings/ramets at initial spacing 3 m x 3 m = 934
Planned for the orchard at final spacing 6 m x 6 m = 466
Number of individual seedlings/ramets in the orchard at revision date 642
Dates established 1977, 1978, 1979, 1980 Phase out date 2005
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. CIP open pollinated progeny tests: #19014 includes 17 orchard parent trees and test #19015 includes 34 orchard parents, Gold River Clone Bank. BCFS & CFS provenance studies.

SAANICH SEED ORCHARDS

Location: Puckle Road in Saanichton

Agency:

Ministry of Forests

Province of British Columbia

Mailing Address:

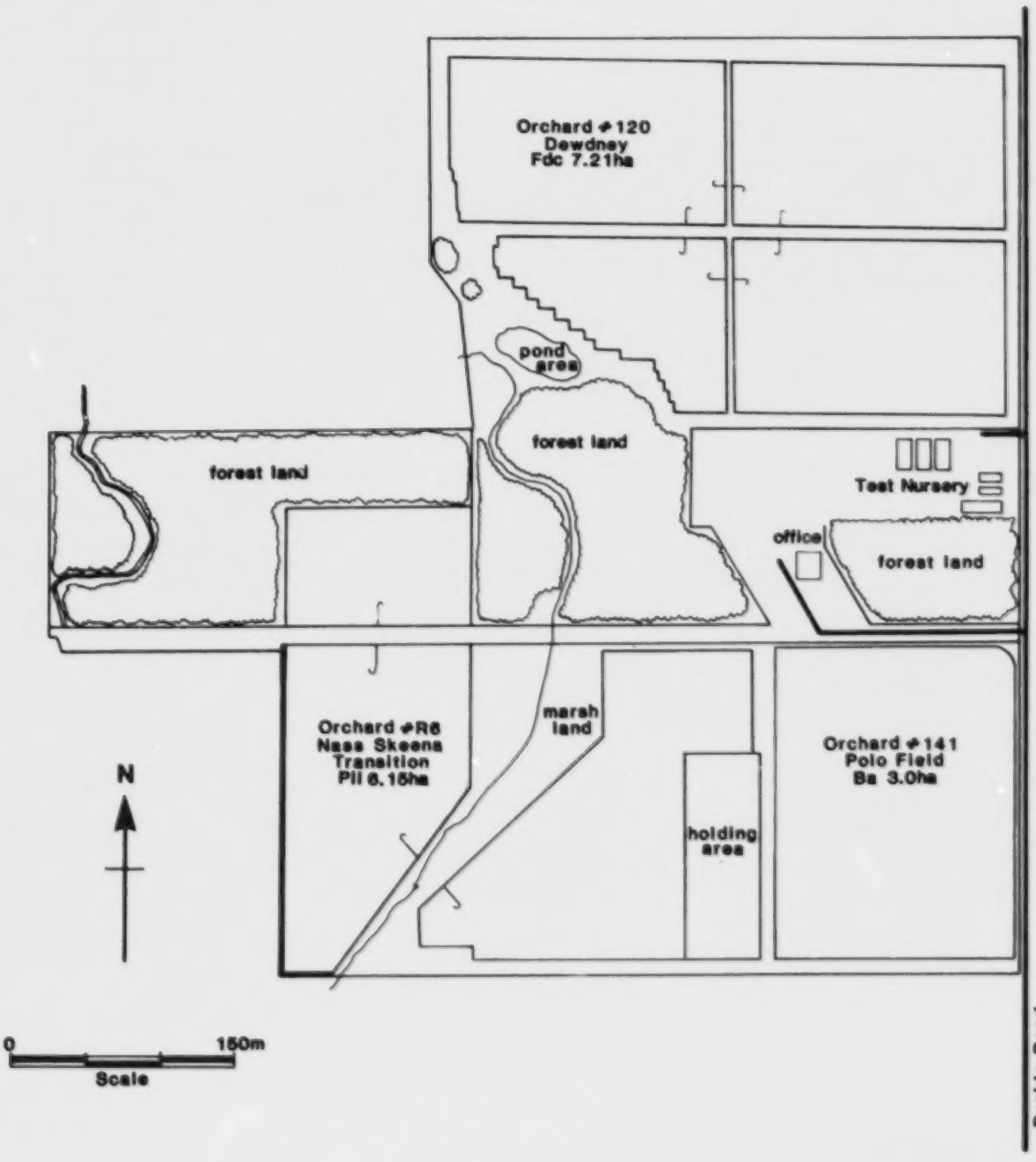
Supervisor: Gord Morrow
Ministry of Forests
Saanich Seed Orchards
7380 Puckle Road
Saanichton, B.C. V0S 1M0
Phone Number: (604) 652-5600

ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- PRODUCING ORCHARDS -----			
120	Dewdney	1975	Fdc	CIT/SCM (SC)	7.21
		----- DEVELOPING ORCHARDS -----			
141	Polo Field	1985/86	Ba	(SCM/EVI)(JS)	3.0
R6	Nass Skeena Transition	1989/90	Pli[1]	NST	6.15
				Total	9.15

[1]Coast-Interior Transition Zone

SITE ORGANIZATION SHOWING SAANICH ORCHARD LOCATIONS



For general location map see "General Location of Central Saanich Seed Orchards" page 42

DEWDNEY ORCHARD (#120)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: CIT/SCM (SC) For Elevational Range: 760 to 1070 m

Estimated total seed needs for the zonal elevation band 30.67 kg/annum
Predicted yield: This orchard 82.34 kg/annum Surplus: 51.67 kgs

Size: Total area 9.62 ha Orchard area 7.21 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 108 families/61 cl.
Number of seedlings/ramets at initial spacing 6.7 m x 3.8 m = 2801
Planned for the orchard at final spacing 6.7 m x 7.6 m = 1413
Number of individual seedlings/ramets in the orchard at revision date 2607/194 = 2801
Date established 1975 Phase out date 50% to be completely phased out in 1990

Type of Orchard/Seed Class: Combined Clonal/O.P.

Tie In With Breeding Program: No. Only 2 trees in breeding program. Limited improvement by pollen management only, using some high elevation SCM/CIT plus trees.

SAANICHTON SEED ORCHARDS

Location: Saanichton

Agency:

C.I.P. Forest Products Inc.
Tahsis Pacific Region

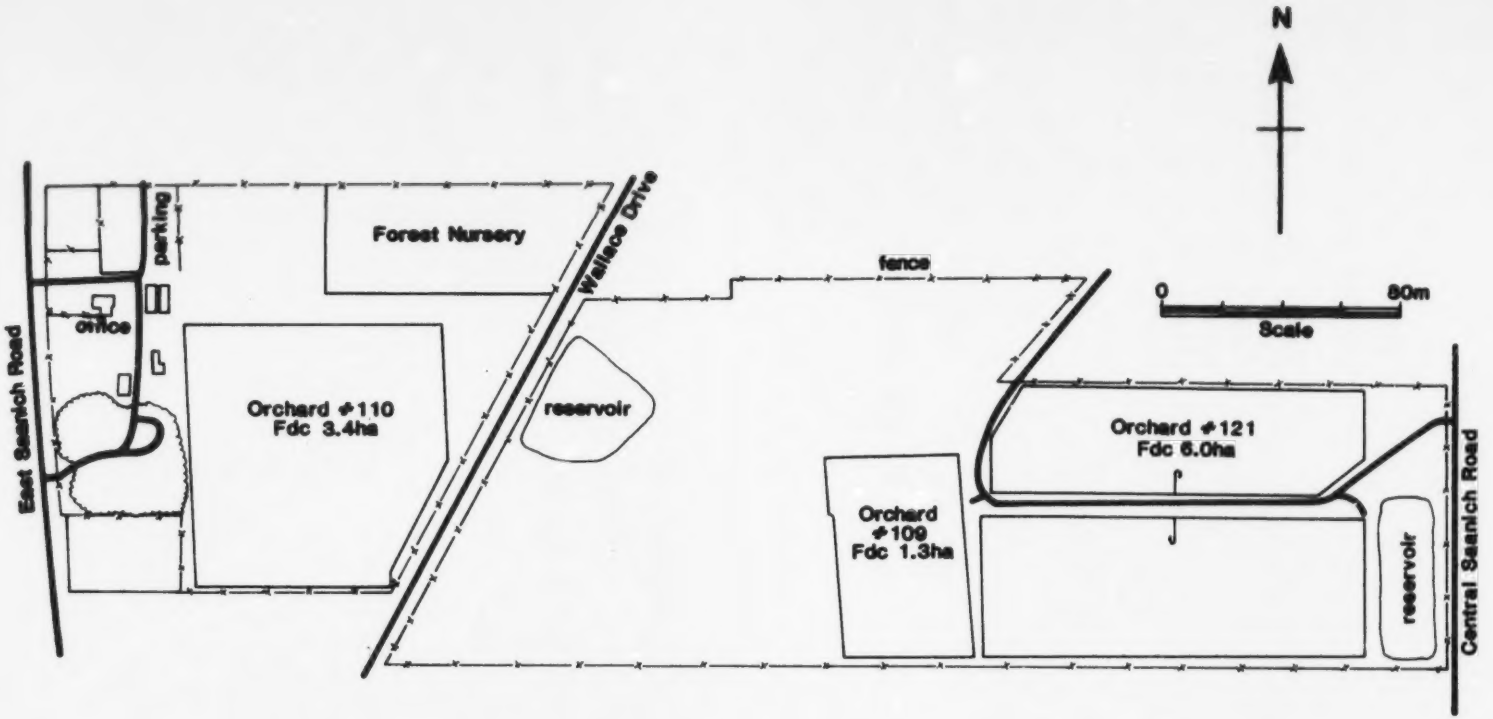
Mailing Address:

Supervisor: Vlad Korelus, R.P.F.
C.I.P. Forest Products Inc.,
Tahsis Pacific Region
RR #1, 8067 East Saanich Road
Saanichton, B.C. V0S 1M0
Phone Number: (604) 652-4023
or 652-3013

ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- PRODUCING ORCHARDS -----			
109	Saanichton	1965-69	Fdc	EVI/SCM	1.3
110	Saanichton	1965-69	Fdc	EVI/SCM	3.4
121	Saanichton	1973	Fdc	EVI/SCM	6.0
				Total	10.7

SITE ORGANIZATION SHOWING SAANICHTON ORCHARD LOCATIONS



For general location map see "General Location of Central Saanich Seed Orchards" page 42

SAANICHTON ORCHARD (#109)

Species: Douglas-fir (coast)

Objective: To produce genetically improved Fdc seed for use in reforestation programs and to provide genetic material for second generation breeding orchards.

For Seed Orchard Planning Zones: EVI, SCM

For Elevational Range: 60 to 500 m

Estimated seed yield at Age 20: 5 kg/annum

Size: Total area 26 ha Orchard area 1.3 ha

Design: A randomized block design with 6 blocks, the number of trees in each block varies between 48 and 1411 according to block size.
Number of Parents: 15 O.P. families/70 clones (all OP fam. present as clonal mat. & seedlings)
Number of seedlings/ramets at initial spacing 3.8 m x 6.7 m = 384
Number of individual seedlings/ramets in the orchard at revision date 304
Dates established 1965/69 Phase out date N/A
Type of Orchard/Seed Class: Combined Clonal/O.P.

Tie In With Breeding Program: Yes. CIP Forest Products Inc. low elevation disconnected diallel mating design.

SAANICHTON ORCHARD (#110)

Species: Douglas-fir (coast)

Objective: To produce genetically improved Fdc seed for use in reforestation programs and to provide genetic material for second generation breeding orchards.

For Seed Orchard Planning Zones: EVI, SCM

For Elevational Range: 300 to 1000 m

Estimated seed yield at Age 20: 30 kg/annum

Size: Total area 26 ha Orchard area 3.4 ha

Design: A randomized incomplete block design with 16 blocks, each block comprising 7 rows with 12 trees per row.
Number of Parents: 37 O.P. families/61 clones (19 OP fam. present as clonal mat. & seedlings)
Number of seedlings/ramets at initial spacing 6.7 m x 3.8 m = 2734
Number of individual seedlings/ramets in the orchard at revision date 2734
Dates established 1965/69 Phase out date N/A
Type of Orchard/Seed Class: Combined Clonal/O.P.

Tie In With Breeding Program: Yes. CIP Forest Products Inc. high elevation disconnected diallel mating design.

SAANICHTON ORCHARD (#121)

Species: Douglas-fir (coast)

Objective: To produce genetically improved Fdc seed for reforestation.

For Seed Orchard Planning Zones: EVI, SCM

For Elevational Range: 370 to 1000 m

Estimated seed yield at Age 20: 60 kg/annum

Size: Total area 26 ha Orchard area 6.0 ha

Design: A systematic row design in 14 blocks with 130 - 170 trees/block depending on block size.
Number of Parents: 68
Number of seedlings/ramets at initial spacing 3.8 m x 6.7 m = 1341
Number of individual seedlings/ramets in the orchard at revision date 1341
Date established 1973 Phase out date N/A
Type of Orchard/Seed Class: Full Sibling*

Tie In With Breeding Program: Yes. CIP Forest Products Inc. high and low disconnected diallel mating design (the orchard is a progeny test).

*This orchard has been described as a "Phase II" orchard. It consists of full-sib seedlings from crosses among first generation parent trees and should yield seed that is of comparable genetic quality to a clonal 1.0 orchard (C. Heamon, pers. comm.).

SECHELT SEED ORCHARDS

Location: Sechelt

Agency:

Canadian Forest Products Ltd.

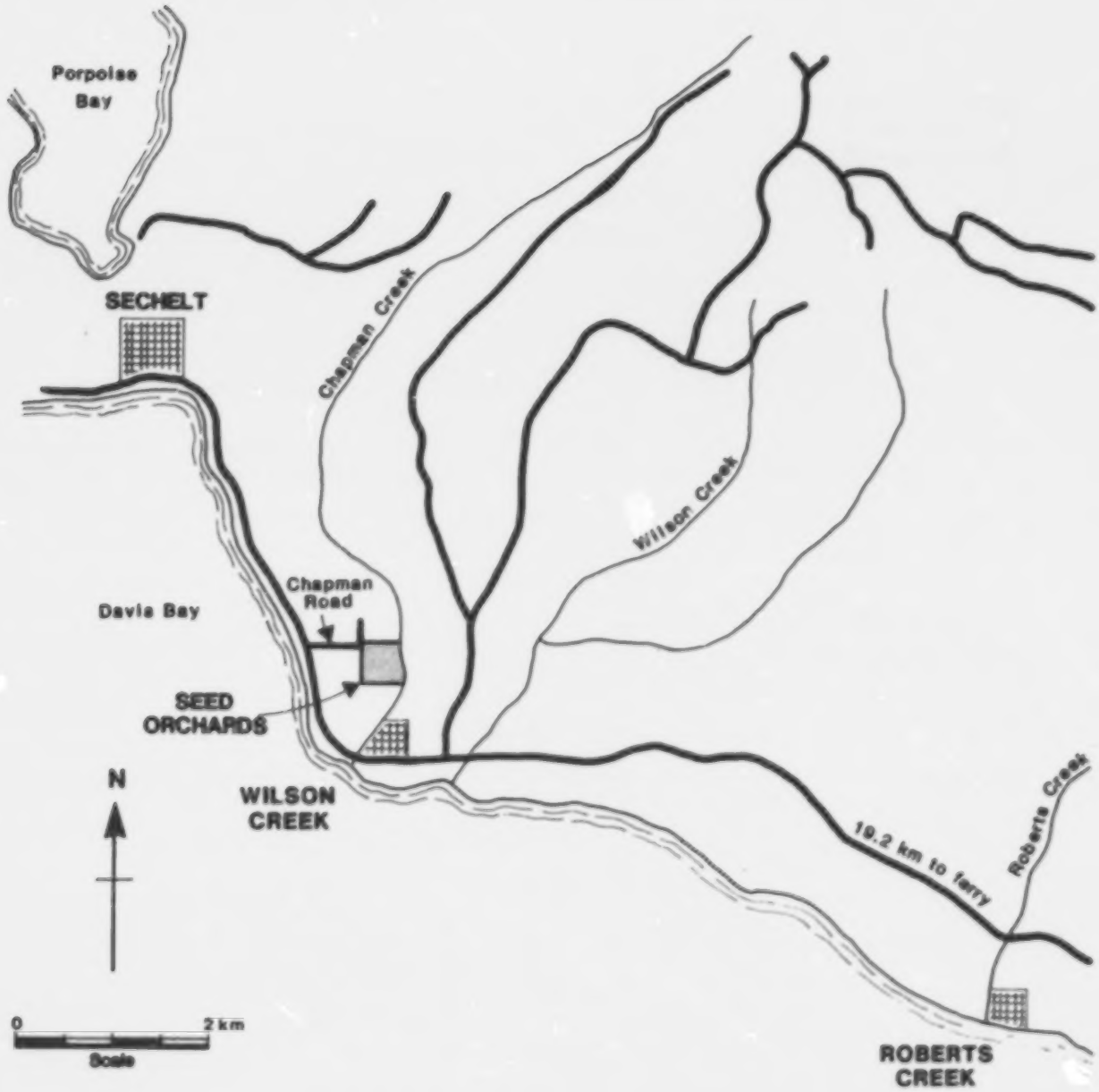
Mailing Address:

Supervisor: M. Alexander
Canadian Forest Products Ltd.
Seed Orchard
R.R. #1
Sechelt, B.C. V0N 3A0
Phone Number: (604) 885-5905

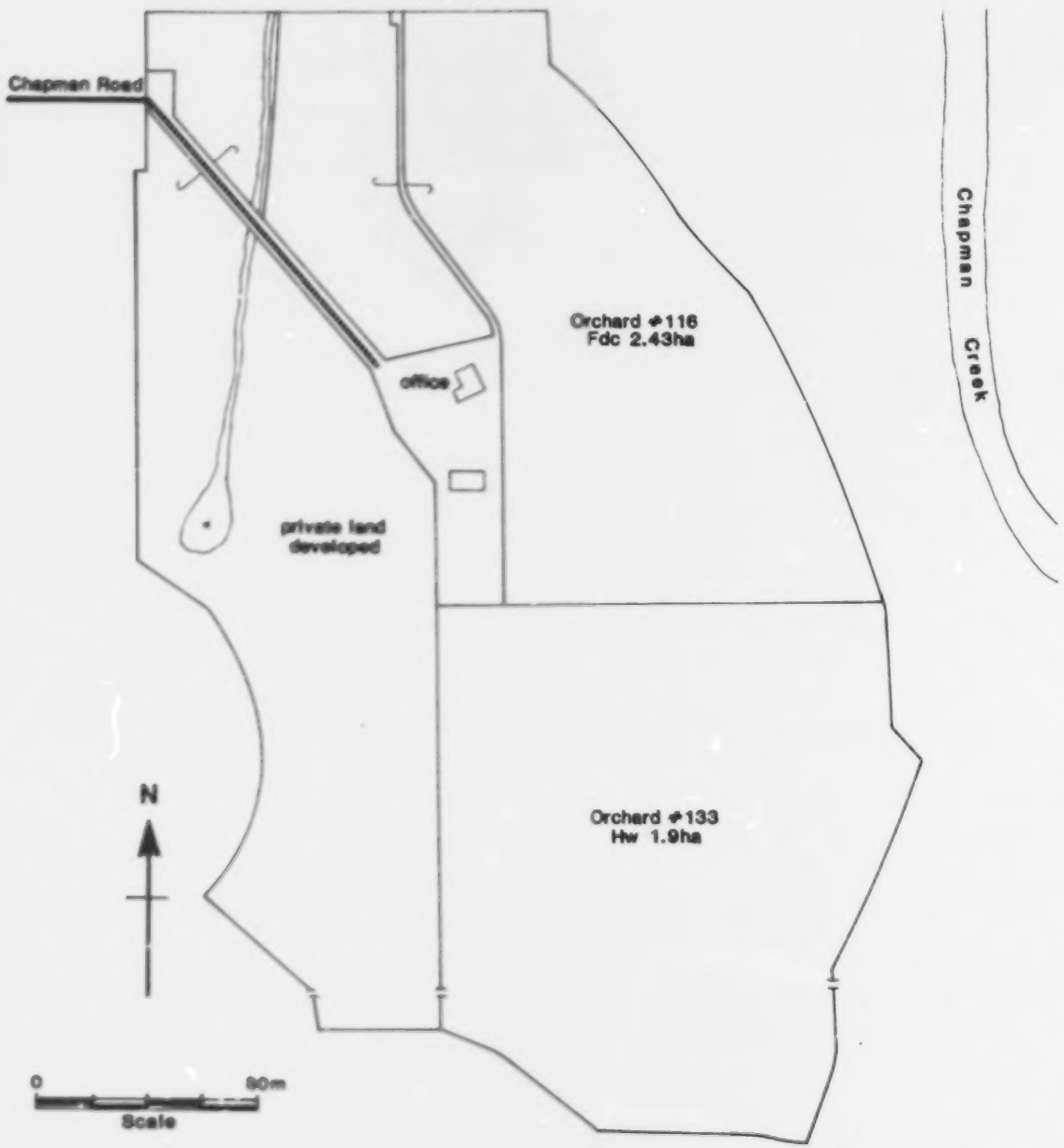
ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- PRODUCING ORCHARDS -----			
116	Sechelt	1971	Fdc	EVI/JS	2.43
		----- ESTABLISHED ORCHARDS -----			
133	Sechelt	1982/83	Hw	JS/SCM	1.90

GENERAL LOCATION OF SECHELT SEED ORCHARDS



SITE ORGANIZATION SHOWING SECHELT ORCHARD LOCATIONS



SECHELT ORCHARD (#116)

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: JS/EVI

For Elevational Range: 600 to 900 m

Estimated total seed needs for the zonal elevation band 10.24 kg/annum
Predicted yield: This orchard 18.37 kg/annum

Size: Total area 2.89 ha Orchard area 2.43 ha

Design: Randomized complete block design, restricted so that no two ramets of a single clone are adjacent at final spacing. Roguing on the basis of genetic information expected to the 5% level.
Number of Parents: 70
Number of seedlings/ramets at initial spacing 4.57 m x 9.14 m = 469 (original area) and 4.57 m x 4.57 m = 220 (expansion area)
Planned for the orchard at final spacing 4.57 m x 9.14 m = 579
Number of individual seedlings/ramets in the orchard at revision date 563
Dates established 1971 - New 1983 Phase out date 2005
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Some.

SECHELT ORCHARD (#133)

Species: Western hemlock

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: JS/SCM

For Elevational Range: 0 to JS 300 m, SCM 450

Estimated seed yield at Age 12: 1.36 kg/annum
Estimated total seed needs for the zonal elevation band 1.26 kg/annum

Size: Total area 2.69 ha Orchard area 1.9 ha

Design: Computer organized orchard layout (COOL) - 4 blocks for JS and 1 block for SCM.
Number of Parents: (90 JS) - (40 SCM)
Number of seedlings/ramets at initial spacing 3.5 m x 6 m = 960
Planned for the orchard at final spacing 7 m x 6m = 480
Number of individual seedlings/ramets in the orchard at revision date 686
Dates established 1982 - 1983 Phase out date 2013
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes.

YELLOW POINT SEED ORCHARDS

Location: south of Nanaimo

Agency:

MacMillan Bloedel Ltd.

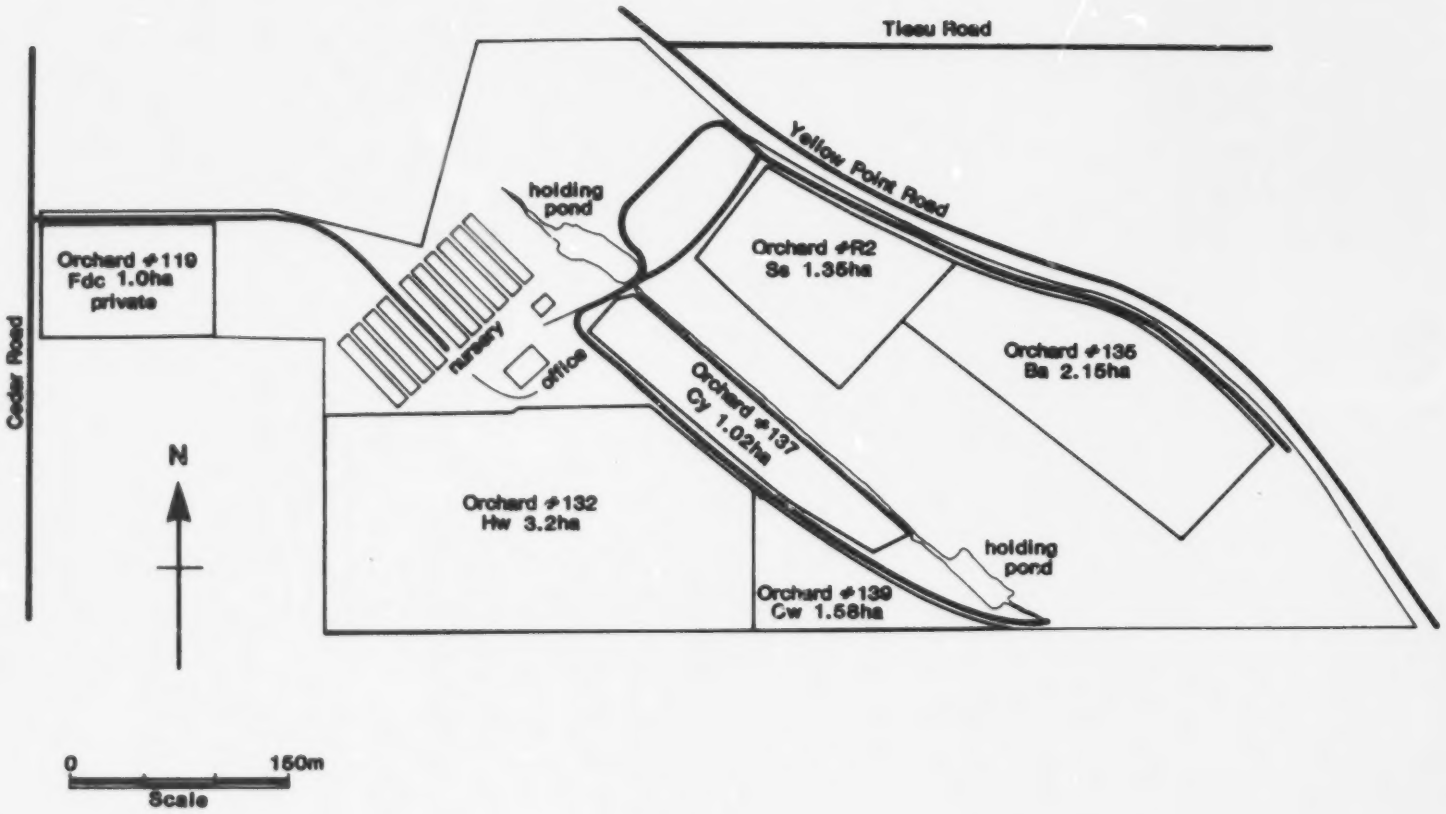
Mailing Address:

Supervisor: Phyllis Harvey
Yellow Point Seed Orchard
65 Front Street
Nanaimo, B.C. V9R 5H9
Phone Number: (604) 753-1112

ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- ESTABLISHED ORCHARDS -----			
119	Yellow Pt. (private)	1979	Fdc	EVI/SCM	1.0
132	Yellow Pt.	1982/83	Hw	WVI	3.2
				Total	4.2
		----- DEVELOPING ORCHARDS -----			
135	Yellow Pt.	1984/85	Ba	EVI/SCM	2.15
137	Yellow Pt.	1984/85	Cy	SCM/CIT	1.02
139	Yellow Pt.	1985/86	Cw	WVI	1.58
R2	Yellow Pt.	1984/85	Ss	MCM/NCM	1.35
				Total	6.10

SITE ORGANIZATION SHOWING YELLOW POINT ORCHARD LOCATIONS



For general location map see "General Location of Harmac & Yellow Point Seed Orchards" page 22

YELLOW POINT ORCHARD (#119) - private

Species: Douglas-fir (coast)

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: EVI, SCM

For Elevational Range: 600 to 900 m

Estimated seed yield at Age 15: 6.5 kg/annum

Size: Orchard area 1.0 ha

Design: Random, restricted so that at least 2 rows and 2 columns are between ramets of the same clone.
Number of Parents: 50
Number of seedlings/ramets at initial spacing 3.7 m x 7.3 m = 600
Planned for the orchard at final spacing 7.3 m x 7.3 m = 200
Number of individual seedlings/ramets in the orchard at revision date 308
Date established 1979 Phase out date 1999
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. MB has initiated a progeny testing program.

YELLOW POINT ORCHARD (#132)

Species: Western hemlock

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zone: WVI

For Elevational Range: 0 to 450 m

Estimated seed yield at Age 12: 2.482 kg/annum
Estimated total seed needs for the zonal elevation band 3.80 kg/annum

Size: Total area 3.7 ha Orchard area 3.2 ha

Design: Permutated neighbourhood based on computer organized orchard layout (COOL).
Number of Parents: 120
Number of seedlings/ramets at initial spacing 3 m x 6 m = 1920
Planned for the orchard at final spacing 6 m x 6 m = 960
Number of individual seedlings/ramets in the orchard at revision date 1165
Date established 1982 Phase out date 2017
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Genetic improvement in this orchard will be achieved through roguing on the basis of parent tree performance in progeny tests established by the Ministry of Forests.

INTERIOR SEED ORCHARDS

BALCO REFORESTATION CENTRE – Balco Industries

EAGLE ROCK – Crown Forest Industries

GRANDVIEW – Weyerhaeuser Canada

KALAMALKA – Ministry of Forests

RED ROCK – Ministry of Forests

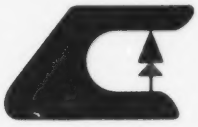
SKIMIKIN – Ministry of Forests

BALCO REFORESTATION CENTRE SEED ORCHARDS

Location: Heffley Creek, North of Kamloops

Agency:

Balco Industries Ltd.
- managed by Balco Industries (Kamloops) for Takla Logging Co. (Prince George)



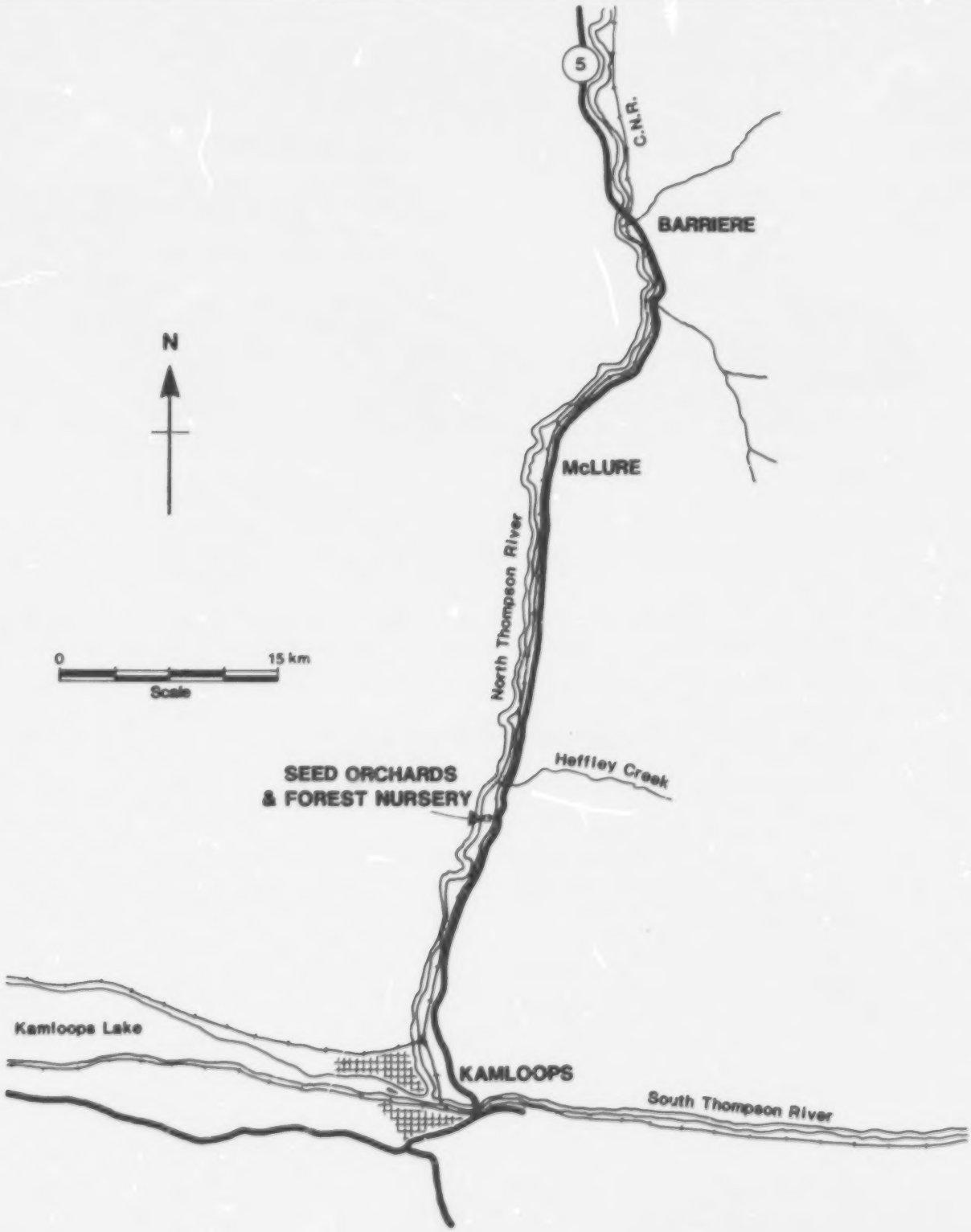
Mailing Address:

Supervisor: Gary Castonguay
Reforestation and Research Division
Balco Industries Ltd
R.R. #3
Kamloops, B.C. V2C 5K1
Phone Number: (604) 578-7212

ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
	----- ESTABLISHED ORCHARDS -----				
217	North Central (1.5 gen.)	1984	Sx	CP/BLK	2.1
	----- DEVELOPING ORCHARDS -----				
308	Thompson Okanagan (1.75 gen.)	1988	Pli	TOD/TOA	5.0

GENERAL LOCATION OF BALCO REFORESTATION CENTRE SEED ORCHARDS



SITE ORGANIZATION SHOWING BALCO REFORESTATION CENTRE ORCHARD LOCATIONS

NORTH CENTRAL ORCHARD (#217)

Species: Interior Spruce

Objective: To produce regular quantities of genetically improved seed:

For Seed Orchard Planning Zones: CP/BLK

For All Elevations

Estimated seed yield: 8.25 kg/annum
Estimated total seed needs for this zonal elevation band 8.5 kg/annum

Size: Total area 2.84 ha Orchard area 2.1 ha

Design: Permutated neighbourhood design. The system is based on maximum distance of separation between the ramets.
Number of Parents: 149
Number of seedlings/ramets at initial spacing 5 m x 2.5 m = 1639
The orchard will be rogued by the 10th year.
Date established 1984 Phase out date 2015
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Further results of progeny test will identify superior clones to remain in a genetically improved orchard.

The anticipated roguing intensity will be 75%. After roguing, the average orchard spacing will be 5 m x 5 m.

This is a 1.5 generation orchard. Clones used at the time of establishment belong to the top 50% of initial selections made in 1968 and 1969 in the Smithers and Prince George selection units based on 6 and 10 year old progeny test data respectively.

EAGLE ROCK SEED ORCHARDS

Location: Armstrong

Agency:

Crown Forest Industries

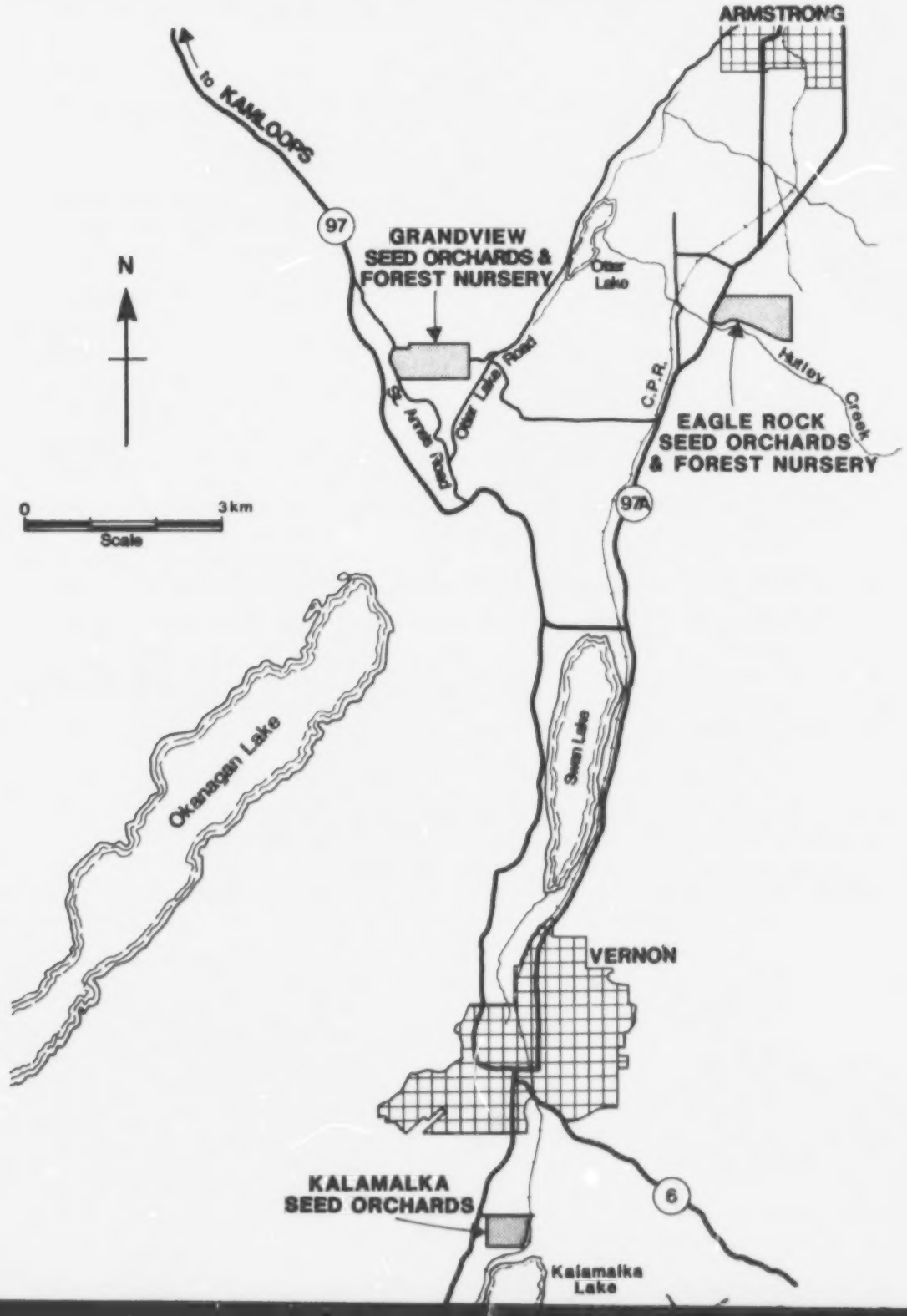
Mailing Address:

Supervisor: George Nicholson
Crown Forest Industries Ltd.
820 Guy Street
Kelowna, B.C. V1Y 7N5
Phone Number: (604) 762-3411

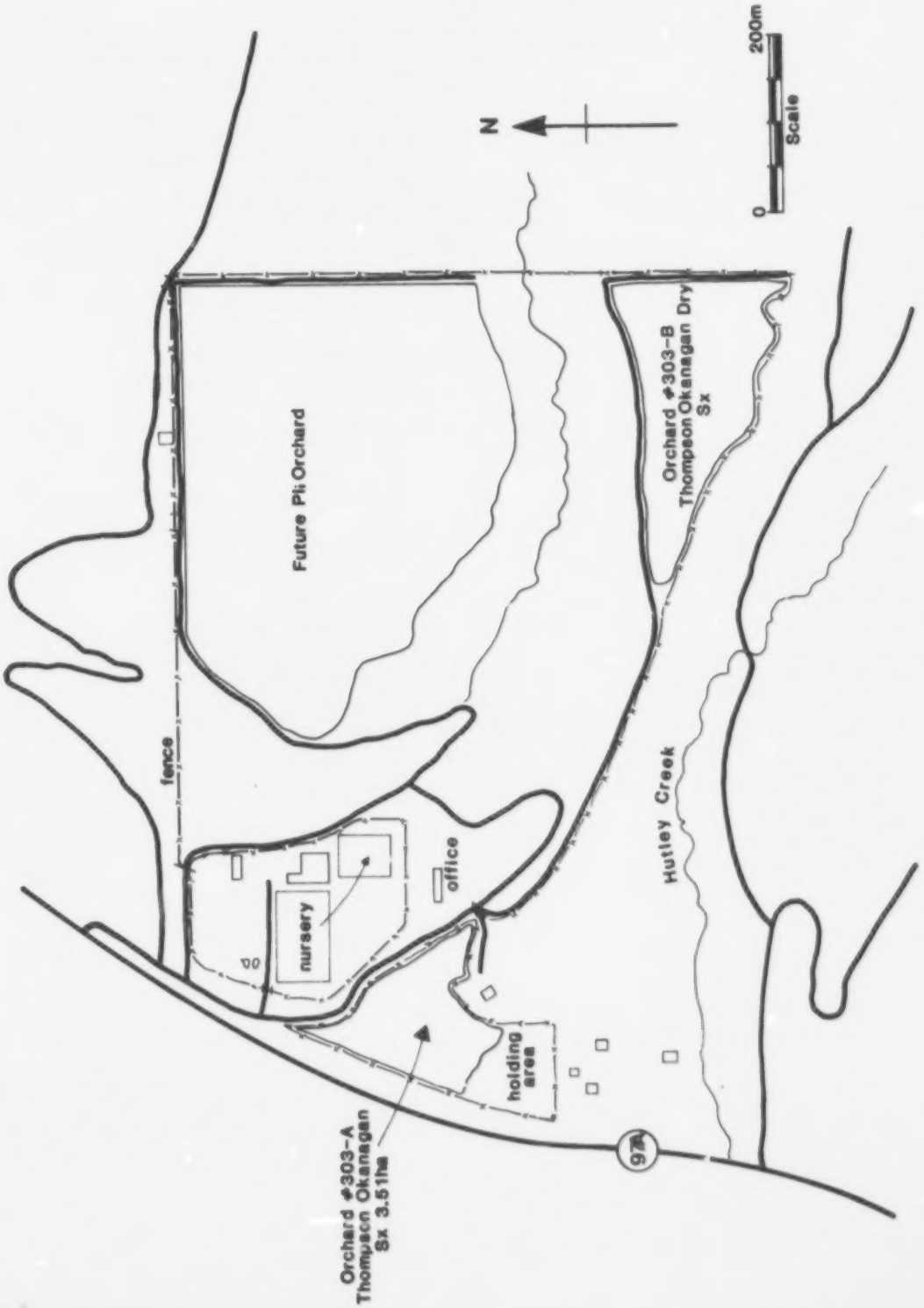
ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- ESTABLISHED ORCHARDS -----			
303	Thompson Okanagan	1984	Sx	TOA/TOD	3.51

GENERAL LOCATION OF NORTH OKANAGAN SEED ORCHARDS



SITE ORGANIZATION SHOWING EAGLE ROCK ORCHARD LOCATIONS



THOMPSON OKANAGAN ORCHARD (#303)

Species: Interior Spruce

Objective: To produce broadly adapted seed, using genetic information to maximize improvement.

For Seed Orchard Planning Zones: TOA/TOD

For Elevational Range: 1400 to 1900 m

Estimated seed yield by year 2000 14.5 kg (5.8 million seedlings)
by year 2007 29 kg (11.6 million seedlings)
Estimated total seed needs for the zonal elevation band 3.80 kg/annum

Size: Total area 5.27 ha Orchard area 3.51 ha

Design: Permutated neighbourhood design.
Number of Parents: 250
Number of seedlings/ramets at initial spacing 5 m x 2 1/2 m = 2806
Planned for the orchard at final spacing 5 m x 5 m = 1403
Date established 1984 Phase out date 2020
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes, the orchard families will be stressed and booster pollinated to produce seeds for progeny tests. When seed has been collected for a minimum of 80% of the families, then progeny tests will be established. The orchard will be rogued on the basis of the test results.

GRANDVIEW SEED ORCHARDS

Location: Armstrong

Agency:

Weyerhaeuser Canada Ltd.

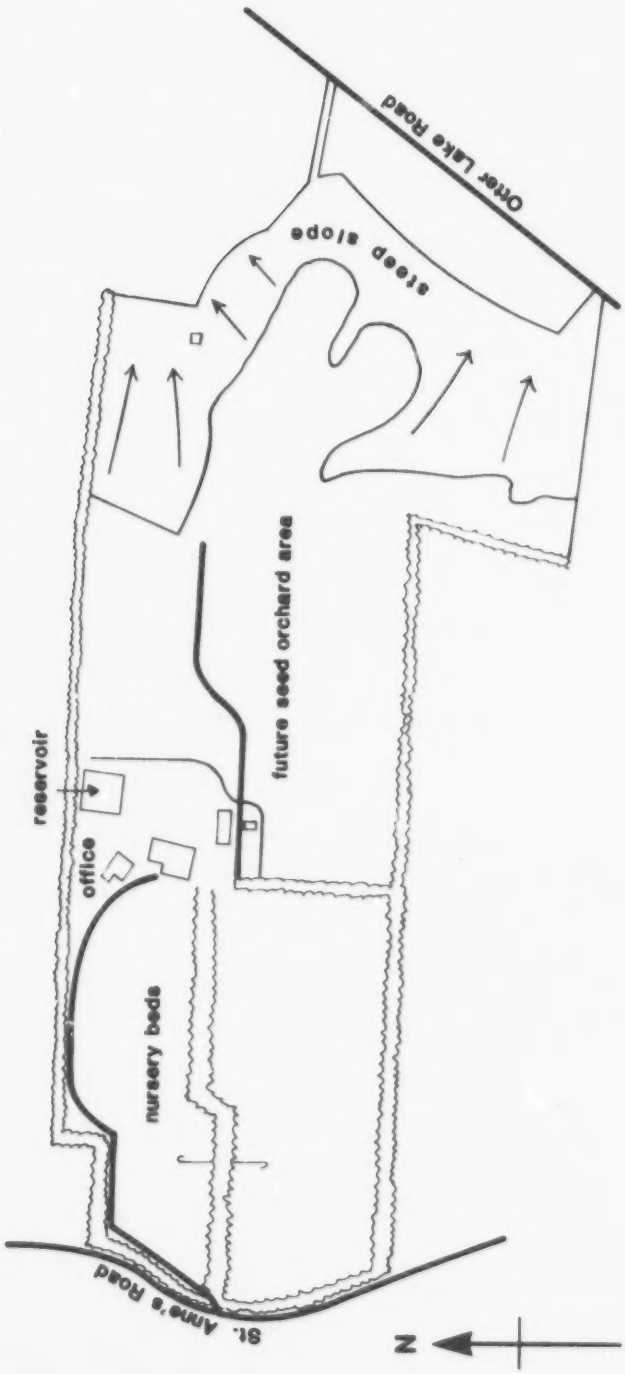
Mailing Address:

Supervisor: Tom Daniels
St. Annes Road
R.R. #3
Armstrong, B.C.
V0E 1B0
Phone Number: (604) 546-8711

ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- DEVELOPING ORCHARDS -----			
214	Bowron Lakes (I)	1986-87	Sx	MGR/MRB/QL	7.4

SITE ORGANIZATION SHOWING GRANDVIEW ORCHARD LOCATIONS



For general location map see "General Location of North Okanagan Seed Orchards" page 80

KALAMALKA SEED ORCHARDS

Location: Vernon

Agency:

Ministry of Forests

Province of
British Columbia

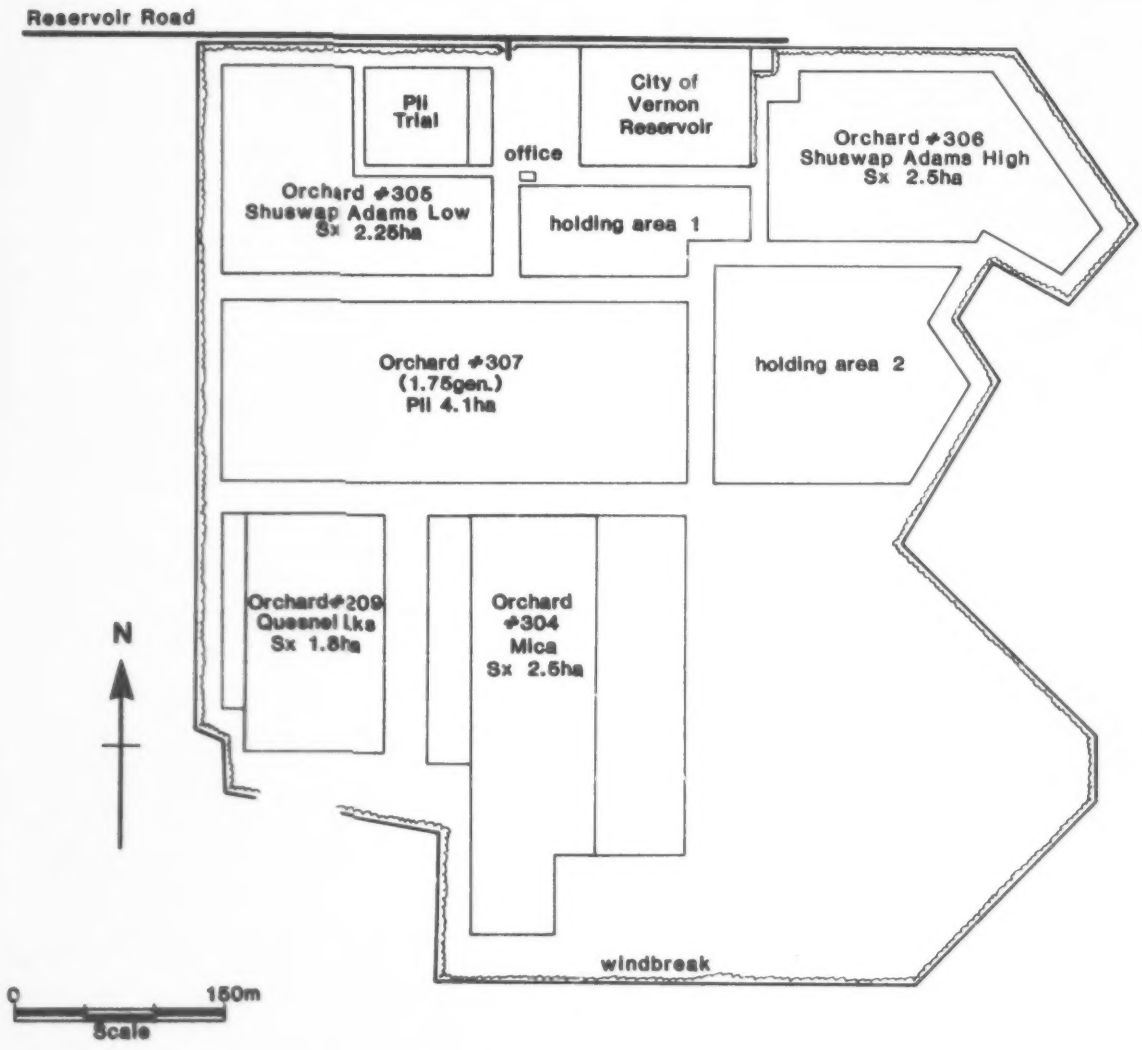
Mailing Address:

Supervisor: Gary Clarke
Kalamalka Research Station
and Seed Orchard
3401 Reservoir Road
Vernon, B.C. V1B 2C7
Phone Number: (604) 545-2285

ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
	----- ESTABLISHED ORCHARDS -----				
305	Shuswap Adams Low	1981	Sx	SA (L)	2.25
306	Shuswap Adams High	1981	Sx	SA (H)	2.50
				Total	4.75
	----- DEVELOPING ORCHARDS -----				
209	Quesnel Lakes	1982/85	Sx	QL	2.1
304	Mica & E. Kootenay(1.5 gen.)	1984	Sx	MIC/EK	5.6
307	Shuswap Adams (1.75 gen.)	1986	Pli	SA/TO	4.1
				Total	11.8

SITE ORGANIZATION SHOWING KALAMALKA ORCHARD LOCATIONS



For general location map see "General Location of North Okanagan Seed Orchards" page 80

SHUSWAP ADAMS LOW ORCHARD (#305)

Species: Interior Spruce

Objective: To produce regular quantities of high quality seed.

For Seed Orchard Planning Zone: SA Lo

For Elevational Range: 0 to 1500 m

Estimated seed yield at Age 15: 10 kg/annum.
Projected total seed needs for this zonal band 9.5 kg/annum.

Size: Total area 2.95 ha Orchard area 2.25 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 100
Number of seedlings/ramets at initial spacing * m x * m = 1000
Planned for the orchard at final spacing * m x * m = 1000
Number of individual seedlings/ramets in the orchard at revision date 818
Date established 1981 Phase out date 2012
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Results of progeny tests will identify superior clones to incorporate into a genetically improved orchard.

*initial spacing = final spacing: 2 blocks 2.5 x 5 m, 8 blocks 5 x 5 m.

SHUSWAP ADAMS HIGH ORCHARD (#306)

Species: Interior Spruce

Objective: To produce regular quantities of high quality seed.

For Seed Orchard Planning Zone: SA

For Elevational Range: ≥ 1500 m

Estimated seed yield at Age 15: 10 kg/annum.
Projected total seed needs for this zonal band 11.8 kg/annum.

Size: Total area 3.3 ha Orchard area 2.5 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 100
Number of seedlings/ramets at initial spacing 5 m x 5 m = 1000
Planned for the orchard at final spacing 5 m x 5 m = 1000
Number of individual seedlings/ramets in the orchard at revision date 720
Date established 1981 Phase out date 2012
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Results of progeny tests will identify superior clones to incorporate into a genetically improved orchard.

RED ROCK SEED ORCHARDS

Location: Red Rock Tree Improvement Centre, 24 km south of Prince George

Agency:

Ministry of Forests

Province of British Columbia

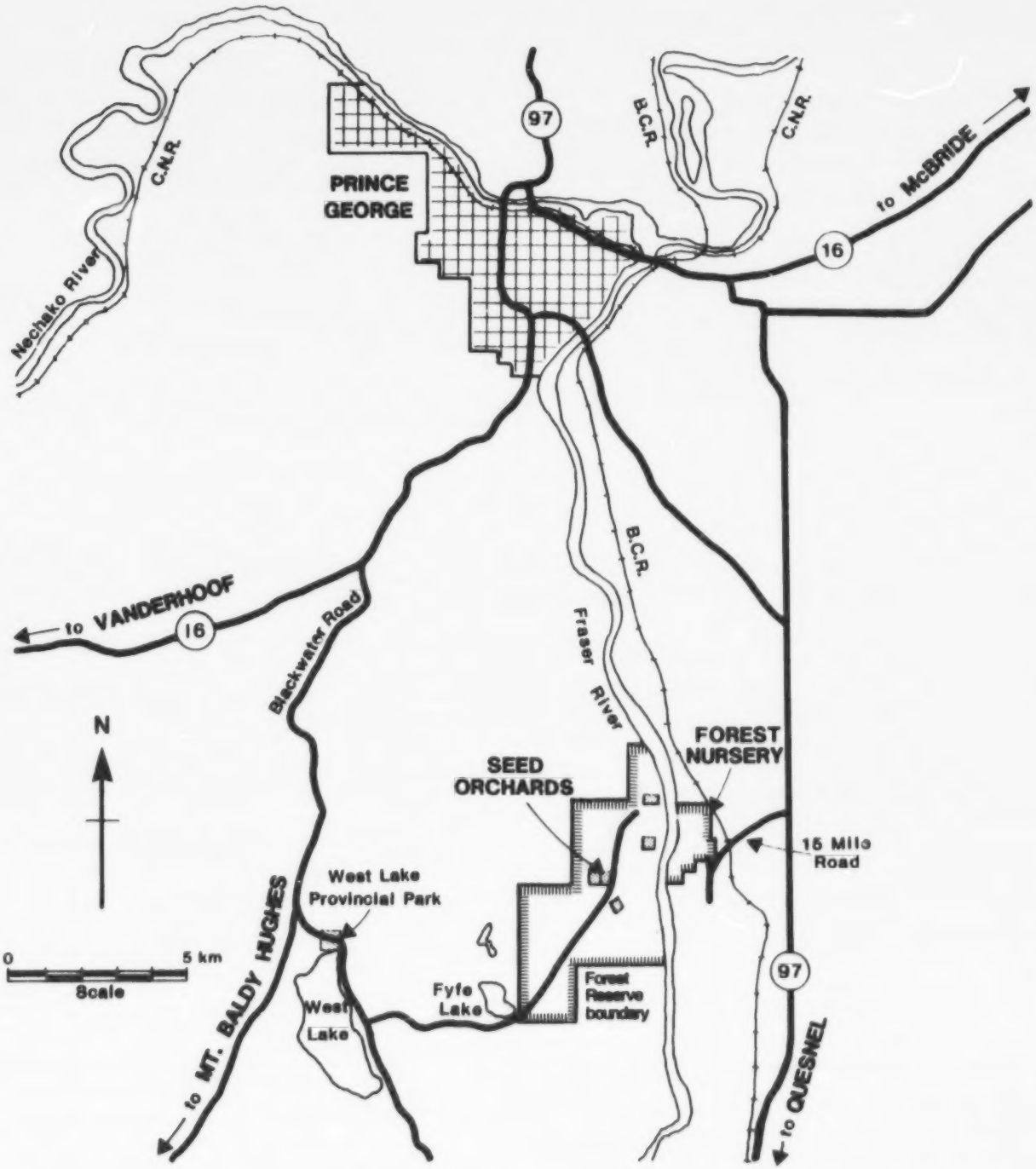
Mailing Address:

Supervisor: Mike Maguire
Red Rock Nursery & Research Centre
Ministry of Forests
R.R. #7, R.M.D. 6
Prince George, B.C. V2N 2J5
Phone Number: (604) 963-8661

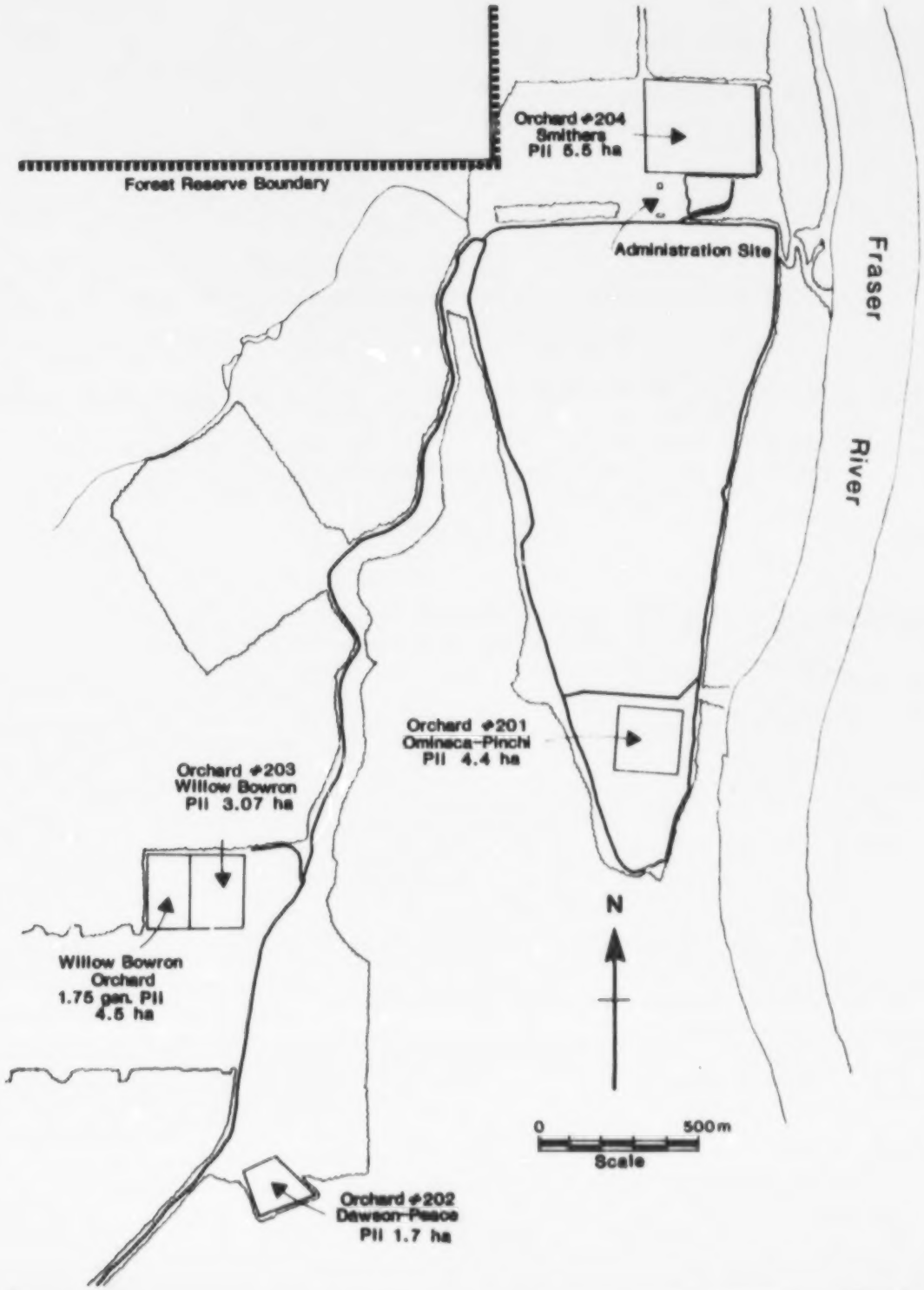
ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
	----- ESTABLISHED ORCHARDS -----				
201	Omineca-Pinchi	1974	Pli	CP	4.4
202	Dawson-Peace	1978	Pli	HH	1.70
203	Willow Bowron	1978	Pli	QL/MGR	3.07
204	Smithers	1979	Pli	BLK	5.50
				Total	14.67
	----- DEVELOPING ORCHARDS -----				
	Willow Bowron (1.75 gen.)	1987	Pli	MGR/QL/CT	4.5

GENERAL LOCATION OF RED ROCK SEED ORCHARDS



SITE ORGANIZATION SHOWING RED ROCK ORCHARD LOCATIONS



OMINECA PINCHI ORCHARD (#201)

Species: Lodgepole pine (interior)

Objective: To produce improved seed.

For Seed Orchard Planning Zone: CP

For Elevational Range: 650 to 1100 m

Target Seed Yield at Age 15: 1.5 kg/annum
Estimated total seed needs for this zonal elevation band 1.5 kg/annum

Size: Total area 6.30 ha Orchard area 4.40 ha

Design: Modified Random Block Design. No two ramets from the same clone adjacent either prior to or after thinning.
Number of Parents: 36
Number of individual seedlings/ramets in the orchard 1296
Date established 1974 Phase out date 1999
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Clone/breeding bank established at Red Rock Nursery. The original selections were made by the U.B.C. for Stora Kopparberg Co. of Sweden.

DAWSON PEACE ORCHARD (#202)

Species: Lodgepole pine (interior)

Objective: To produce improved seed.

For Seed Orchard Planning Zone: HH

For Elevational Range: 500 to 1000 m

Target Seed Yield at Age 15: 1.4 kg/annum
Estimated total seed needs for this zonal elevation band 1.4 kg/annum

Size: Total area 2.28 ha Orchard area 1.7 ha

Design: Modified random block design - 20 blocks at 4 x 6 m spacing - no interplanting. No systematic thinning planned.
Number of Parents: 36
Number of individual seedlings/ramets in the orchard 720
Date established 1978 Phase out date 2003
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Clone/breeding bank established at Red Rock Nursery. The original selections were made by the U.B.C. for Stora Kopparberg Co. of Sweden. Tree improvement program awaiting arrival of pine geneticist.

WILLOW BOWRON ORCHARD (#203)

Species: Lodgepole pine (interior)

Objective: To produce improved seed.

For Seed Orchard Planning Zones: QL/MGR

For Elevational Range: 50 to 1200 m

Target Seed Yield at Age 15: 2.4 kg/annum
Estimated total seed needs for this zonal elevation band 2.4 kg/annum

Size: Total area 5.90 ha Orchard area 3.07 ha

Design: Modified random block design - 11 blocks at 4 x 6 m spacing. No interplanting. No systematic thinning planned.
Number of Parents: 110
Number of individual seedlings/ramets in the orchard 1210
Date established 1978 Phase out date 2003
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Selections made by research division but breeding program awaiting arrival of pine geneticist.

SMITHERS ORCHARD (#204)

Species: Lodgepole pine (interior)

Objective: To produce improved seed.

For Seed Orchard Planning Zone: BLK

For Elevational Range: 700 to 1150 m

Target Seed Yield at Age 15: 2.8 kg/annum
Estimated total seed needs for this zonal elevation band 2.8 kg/annum

Size: Total area 10.88 ha Orchard area 5.50 ha

Design: Modified random block design - 12 blocks at 6 x 6 m spacing no interplanting. No systematic thinning planned.
Number of Parents: 120
Number of individual seedlings/ramets in the orchard 1440
Date established 1974 Phase out date 2004
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Selections made by research division but breeding program awaiting arrival of pine geneticist.

SKIMIKIN SEED ORCHARDS

Location: Skimikin Nursery Reserve, 24 kms west of Salmon Arm

Agency:

Ministry of Forests

Province of
British Columbia

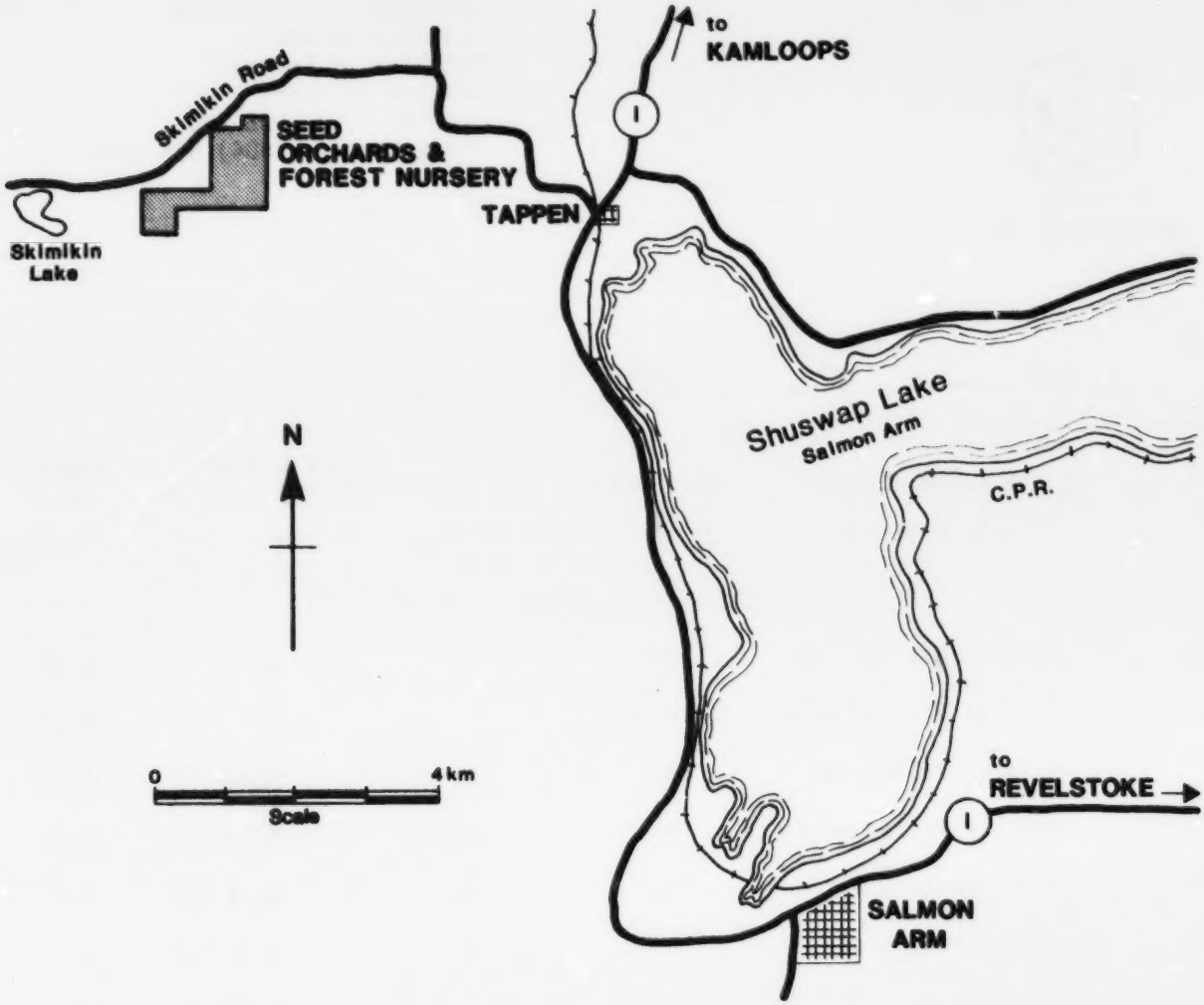
Mailing Address:

Supervisor: Keith Cox
Skimikin Nursery
Ministry of Forests
General Delivery
Tappen, B.C. V0E 2X0
Phone Number: (604) 835-4541

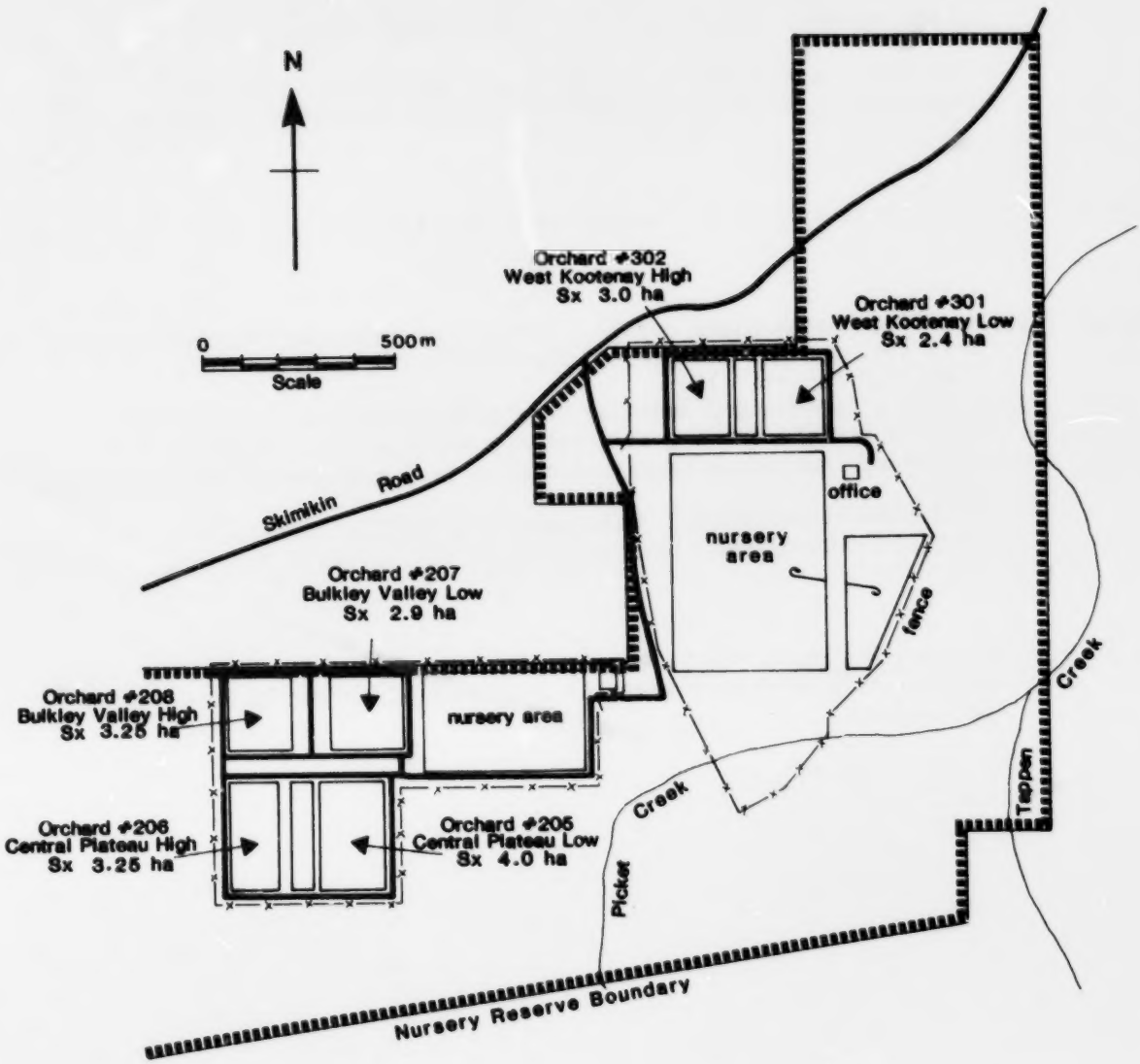
ORCHARD SUMMARY

Seed Orchard No.	Seed Orchard Name	Date(s) Est.	Sp.	Seed Orchard Planning Zone(s)	Orchard ha
		----- ESTABLISHED ORCHARDS -----			
205	Central Plateau Low	1979	Sx	CP	4.00
206	Central Plateau High	1979	Sx	CP	3.25
207	Bulkley Valley Low	1980	Sx	BLK	2.90
208	Bulkley Valley High	1980	Sx	BLK	3.25
301	W. Kootenay Low	1980	Sx	WK & BSH	2.4
302	W. Kootenay High	1980	Sx	WK & BSH	3.0
				Total	18.8

GENERAL LOCATION OF SKIMIKIN SEED ORCHARDS



SITE ORGANIZATION SHOWING SKIMIKIN ORCHARD LOCATIONS



CENTRAL PLATEAU LOW ORCHARD (#205)

Species: Interior Spruce

Objective: To produce regular quantities of high quality seed.

For Seed Orchard Planning Zone: CP

For Elevational Range: ≤840 m

Estimated seed yield at Age 15: 16.0 kg/annum
Projected total seed needs for this zonal band 16.65 kg/annum.

Size: Total area 6.14 ha Orchard area 4.0 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 160
Number of seedlings/ramets at initial spacing 5 m x 5 m = 1600
Planned for the orchard at final spacing 5 m x 5 m = 1600
Number of individual seedlings/ramets in the orchard at revision date 1236
Date established 1979 Phase out date 2010
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Progeny of parent trees, for which O.P. seed is available will be planted on test sites in order to rank family performance.

CENTRAL PLATEAU HIGH ORCHARD (#206)

Species: Interior Spruce

Objective: To produce regular quantities of high quality seed.

For Seed Orchard Planning Zone: CP

For Elevational Range: > 840 m

Estimated seed yield at Age 15: 13.0 kg/annum
Projected total seed needs for this zonal band 17.2 kg/annum.

Size: Total area 5.24 ha Orchard area 3.25 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 130
Number of seedlings/ramets at initial spacing 5 m x 5 m = 1300
Planned for the orchard at final spacing 5 m x 5 m = 1300
Number of individual seedlings/ramets in the orchard at revision date 949
Date established 1979 Phase out date 2010
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Progeny of parent trees, for which O.P. seed is available will be planted on test sites in order to rank family performance.

BULKLEY VALLEY LOW ORCHARD (#207)

Species: Interior Spruce

Objective: To produce regular quantities of high quality seed.

For Seed Orchard Planning Zone: BLK

For Elevational Range: < 840 m

Estimated seed yield at Age 15: 11.7 kg/annum
Projected total seed needs for this zonal band 4.2 kg/annum.

Size: Total area 3.97 ha Orchard area 2.90 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 130
Number of seedlings/ramets at initial spacing 5 m x 5 m = 1170
Planned for the orchard at final spacing 5 m x 5 m = 1170
Number of individual seedlings/ramets in the orchard at revision date 996
Date established 1980 Phase out date 2011
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Progeny of parent trees, for which O.P. seed is available will be planted on test sites in order to rank family performance.

BULKLEY VALLEY HIGH ORCHARD (#208)

Species: Interior Spruce

Objective: To produce regular quantities of high quality seed.

For Seed Orchard Planning Zone: BLK

For Elevational Range: ≥ 840 m

Estimated seed yield at Age 15: 13.0 kg/annum
Projected total seed needs for this zonal band 19.1 kg/annum.

Size: Total area 4.17 ha Orchard area 3.25 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 144
Number of seedlings/ramets at initial spacing 5 m x 5 m = 1296
Planned for the orchard at final spacing 5 m x 5 m = 1296
Number of individual seedlings/ramets in the orchard at revision date 1120
Date established 1980 Phase out date 2011
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Progeny of parent trees, for which O.P. seed is available will be planted on test sites in order to rank the families.

WEST KOOTENAY LOW ORCHARD (#301)

Species: Interior Spruce

Objective: To produce regular quantities of high quality seed.

For Seed Orchard Planning Zones: WK/BSH

For Elevational Range: < 1400 m

Estimated seed yield at Age 15: 9.6 kg/annum
Projected total seed needs for this zonal band 7.5 kg/annum.

Size: Total area 4.3 ha Orchard area 2.4 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 151
Number of seedlings/ramets at initial spacing 5 m x 2.5 m = 1296
some 5 m x 5 m
Planned for the orchard at final spacing 5 m x 5 m = 960
Number of individual seedlings/ramets in the orchard at revision date 1296
Date established 1980 Phase out date 2011
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Controlled mating to evaluate parents and produce a breed population for a second generation orchard.

WEST KOOTENAY HIGH ORCHARD (#302)

Species: Interior Spruce

Objective: To produce regular quantities of high quality seed.

For Seed Orchard Planning Zones: WK/BSH

For Elevations: ≥1400 m (WK) and ≥1350 m (BSH)

Estimated seed yield at Age 15: 9.5 kg/annum
Projected total seed needs for this zonal band 9.1 kg/annum.

Size: Total area 4.3 ha Orchard area 3.0 ha

Design: Modified random block design - all blocks randomized individually so that the same parents are not immediately adjacent.
Number of Parents: 145
Number of seedlings/ramets at initial spacing 5 m x 5 m = 951
Planned for the orchard at final spacing 5 m x 5 m = 951
Number of individual seedlings/ramets in the orchard at revision date 951
Date established 1980 Phase out date 2011
Type of Orchard/Seed Class: Clonal

Tie In With Breeding Program: Yes. Controlled mating to evaluate parents and produce a breed population for a second generation orchard.

*Originally planned for 1200 ramets however, anticipated seed production will exceed seed demand, therefore number of ramets will not be increased.

ORCHARD NUMBER INDEX

SEED ORCHARD NO.	SP.	LOCATION	PAGE
101	Fdc	Campbell River	11
109	Fdc	Saanichton	57
110	Fdc	Saanichton	57
111	Fdc	Nootka	47
114	Fdc	Koksilah	29
115	Fdc	Campbell River	11
116	Fdc	Sechelt	63
118	Ss	Nootka	47
119	Fdc	Yellow Point	69
120	Fdc	Saanich	53
121	Fdc	Saanichton	57
122	Fdc	Harmac	21
123	Fdc	Harmac	21
124	Fdc	Harmac	21
125	Fdc	Harmac	21
126	Hw	Lost Lake	33
127	Hw	Lost Lake	33
128	Cw	Lost Lake	33
129	Ba	Mount Newton	41
130	Hw	Mount Newton	41
131	Se	Cobble Hill	17
132	Hw	Yellow Point	69
133	Hw	Sechelt	63
134	Fdc	Mount Newton	41
135	Ba	Yellow Point	69
136	Hw	Nootka	47
137	Cy	Yellow Point	69

SEED ORCHARD NO.	SP.	LOCATION	PAGE
138	Cy	Mount Newton	41
139	Cw	Yellow Point	69
140	Cw	Mount Newton	41
141	Ba	Saanich	53
142	Ss	Lost Lake	33
143	Hw	Campbell River	11
R2	Ss	Yellow Point	69
R6	Pli	Saanich	53
201	Pli	Red Rock	89
202	Pli	Red Rock	89
203	Pli	Red Rock	89
204	Pli	Red Rock	89
205	Sx	Skimikin	97
206	Sx	Skimikin	97
207	Sx	Skimikin	97
208	Sx	Skimikin	97
209	Sx	Kalamalka	85
214	Sx	Grandview	83
215	Sx	TBA	-
217	Sx	Balco Reforestation Centre	75
301	Sx	Skimikin	97
302	Sx	Skimikin	97
303	Sx	Eagle Rock	79
304	Sx	Kalamalka	85
305	Sx	Kalamalka	85
306	Sx	Kalamalka	85
307	Pli	Kalamalka	85
308	Pli	Balco Reforestation Centre	75
-	Pli	Red Rock (1.75 gen.)	89

APPENDIX I
LIST OF SEED
ORCHARDS BY REGION AND ORCHARD NUMBER[1]

Seed Orchard No.[2]	Agency	Orchard Name (Location)	Sp.	Orchard Ha.	Seed Production (kg) Accumulated to March, 1985
COASTAL REGION					
		----- PRODUCING ORCHARDS -----			
101	MOF	Quinsam (Campbell R.)	Fdc	6.6	227.065
109	CIP Forest Products[3]	Saanichton (Saanichton)	Fdc	1.3	19.058
110	CIP Forest Products[3]	Saanichton (Saanichton)	Fdc	3.4	197.280
111	CIP Forest Products	Nootka (Nootka)	Fdc	4.5	124.781
114	MOF	Koksilah (Koksilah)	Fdc	3.2	224.512
115	MOF	Snowdon (Campbell R.)	Fdc	4.8	66.855
116	Canadian Forest Products	Sechelt (Sechelt)	Fdc	2.43	2.830
118	CIP Forest Products	Nootka (Nootka)	Ss	1.29	5.791
120	MOF	Dewdney (Saanich)	Fdc	7.21	164.995
121	CIP Forest Products[3]	Saanichton (Saanichton)	Fdc	6.0	82.023
			Total	40.73	

[1]Excludes orchards deemed by the Coastal Tree Improvement Council (CTIC) as unsuitable for intensive management.

[2]100 numbered orchards refer to those orchards that produce seed for the Coastal region, 200 numbered orchards are for the Central Interior region, and 300 numbered orchards are for the Southern Interior region.

[3]Private orchard; not funded through credits to stumpage as per Section 88(1) of the Forest Act.

Seed Orchard No.[2]	Agency	Orchard Name (Location)	Sp.	Orchard Ha.	Seed Production (kg) Accumulated to March, 1985
		----- ESTABLISHED ORCHARDS -----			
119	MacMillan Bloedel[3]	Yellow Pt. (Yellow Pt.)	Fdc	1.0	
122	MacMillan Bloedel[3]	Harmac (Harmac)	Fdc	2.5	
123	MacMillan Bloedel[3]	Harmac (Harmac)	Fdc	1.40	
124	MacMillan Bloedel[3]	Harmac (Harmac)	Fdc	1.17	
125	MacMillan Bloedel[3]	Harmac (Harmac)	Fdc	1.46	
126	Western Forest Products	Lost Lk. (Lost Lk.)	Hw	3.66	
127	Western Forest Products	Lost Lk. (Lost Lk.)	Hw	2.4	
128	Western Forest Products	Lost Lk. (Lost Lk.)	Cw	1.1	
132	MacMillan Bloedel	Yellow Pt. (Yellow Pt.)	Hw	3.2	
133	Canadian Forest Products	Sechelt (Sechelt)	Hw	1.9	
134	Crown Forest Industries	Mt. Newton (Mt. Newton)	Fdc	4.9	
136	CIP Forest Products	Nootka (Nootka)	Hw	0.81	0.439
138	Crown Forest Industries	Mt. Newton (Mt. Newton)	Cy	1.12	
140	Crown Forest Industries	Mt. Newton (Mt. Newton)	Cw	0.51	
142	Western Forest Products	Lost Lk. (Lost Lk.)	Ss	2.3	
			Total	29.43	

[3]Private orchard; not funded through credits to stumpage as per Section 88(1) of the Forest Act.

Seed Orchard No.[2]	Agency	Orchard Name (Location)	Sp.	Orchard Ha.	Seed Production (kg) Accumulated to March, 1985
COASTAL REGION					
		----- DEVELOPING ORCHARDS -----			
129	BC Forest Products	Mt. Newton (Mt. Newton)	Ba	7.4	
130	BC Forest Products	Mt. Newton (Mt. Newton)	Hw	7.7	
131	MOF	Cobble Hill (Cobble Hill)	Se	3.03	
135	MacMillan Bloedel	Yellow Pt. (Yellow Pt.)	Ba	2.15	
137	MacMillan Bloedel	Yellow Pt. (Yellow Pt.)	Cy	1.02	
139	MacMillan Bloedel	Yellow Pt. (Yellow Pt.)	Cw	1.58	
141	MOF	Polo Field (Saanich)	Ba	3.0	
143	MOF	South Quinsam (Campbell River)	Hw	3.8	
R2	MacMillan Bloedel	Yellow Pt. (Yellow Pt.)	Ss	1.35	
R6	MOF	Nass Skeena Trans (Saanich)	Pli	6.15	
			Total	37.18	
		Total-Coastal Region		107.34	

Seed Orchard No.	Agency	Orchard Name (Location)	Sp.	Orchard Ha.	Seed Production (kg) Accumulated to March, 1985
CENTRAL INTERIOR REGION					
		----- ESTABLISHED ORCHARDS -----			
201	MOF	Omineca-Pinchi (Red Rock)	Pli	4.4	5.09
202	MOF	Dawson-Peace (Red Rock)	Pli	1.7	
203	MOF	Willow-Bowron (Red Rock)	Pli	3.07	
204	MOF	Smithers (Red Rock)	Pli	5.5	
205	MOF	Central Plateau Low (Skimikin)	Sx	4.0	
206	MOF	Central Plateau High (Skimikin)	Sx	3.25	0.520
207	MOF	Bulkley Valley Low (Skimikin)	Sx	2.9	0.450
208	MOF	Bulkley Valley High (Skimikin)	Sx	3.25	1.350
217	Balco Industries Ltd.	North Central (1.5 gen.) (Balco Reforestation Centre)	Sx	2.1	
			Total	30.17	
		----- DEVELOPING ORCHARDS -----			
209	MOF	Quesnel Lakes (Kalamalka)	Sxw	2.1	
214	Weyerhaeuser Canada	Bowron Lakes I (Grandview)	Sxw	7.4	
215	-	Bowron Lakes II (TBA)	Sxw	6.8	
-	MOF	Willow Bowron (1.75 gen) (Red Rock)	Pli	4.5	
			Total	20.8	
		Total - Central Interior Region		50.97	

Seed Orchard No.	Agency	Orchard Name (Location)	Sp.	Orchard Ha.	Seed Production (kg) Accumulated to March, 1985
SOUTHERN INTERIOR REGION					
		----- ESTABLISHED ORCHARDS -----			
301	MOF	W. Kootenay Low (Skimikin)	Sx	2.4	
302	MOF	W. Kootenay High (Skimikin)	Sx	3.0	
303	Crown Forest Industries	Thompson Ok (Eagle Rock)	Sx	3.51	
305	MOF	Shuswap Adams Low (Kalamalka)	Sx	2.25	
306	MOF	Shuswap Adams High (Kalamalka)	Sx	2.5	
			Total	13.66	
		----- DEVELOPING ORCHARDS -----			
304	MOF	Mica&E. Kootenays (1.5 gen) at (Kalamalka)	Sx	5.6	
307	MOF	Shuswap Adams (1.75 gen) (Kalamalka)	Pli	4.1	
308	Balco Industries	Thompson Ok. (1.75 gen) (Balco Reforestation Centre)	Pli	5.0	
			Total	14.70	
		Total - Southern Interior Region		28.36	
		GRAND PROVINCIAL TOTAL		186.67	

APPENDIX II
A LIST OF THE SEED ORCHARD PLANNING ZONES AND THEIR SUPPLYING ORCHARDS.

SEED ORCHARD PLANNING ZONE	SP.	ELEV. (m)	SUPPLYING ORCHARD
Coast			
EVI Eastern Van. Island	Fdc	60-500	Saanichton #109*
		300-700	Quinsam #101*
		300-1000	Saanichton #110*
		370-1000	Saanichton #121*
		600-900	Sechelt #116*
	Ba	450-900	Polo Field #141
		≥900	Yellow Pt. #135
	Cy	600-1000	Mt. Newton #138
	Cw	0-450	Mt. Newton #140
WVI Western Van. Island	Fdc	0-610	Nootka #111*
	Hw	0-450	Nootka #136/Yellow Pt. #132
		450-900	Mt. Newton #130
	Ss	0-450	Nootka #118*
	Ba	0-600	Mt. Newton #129
	Cy	600-1000	Mt. Newton #138
	Cw	0-600	Yellow Pt. #139
JS Johnstone Straight	Fdc	0-450	Snowdon #115*/Mt. Newton #134
		600-900	Sechelt #116*
	Hw	0-300	Sechelt #133
		450-900	South Quinsam #143
	Ba	0-450	Mt. Newton #129
		450-900	Polo Field #141
	Cy	600-1000	Mt. Newton #138
	Cw	0-450	Mt. Newton #140
SCM South Coast Mainland	Fdc	60-500	Saanichton #109*
		300-1000	Saanichton #110*
		305-922	Koksilah #114*
		370-1000	Saanichton #121*
		760-1070	Dewdney #120*
	Hw	0-450	Sechelt #133
		450-900	South Quinsam #143
	Ba	450-900	Polo Field #141
		≥900	Yellow Pt. #135
	Cy	700-1200	Yellow Pt. #137
	Cw	0-450	Mt. Newton #140
CIT Coast Interior Transition	Fdc	350-755	Koksilah #114*
		760-1070	Dewdney #120*
	Cy	700-1200	Yellow Pt. #137
	Se	1100-1500	Cobble Hill #131

*indicates a producing orchard

SEED ORCHARD PLANNING ZONE	SP.	ELEV. (m)	SUPPLYING ORCHARD
SC Subcontinental	Fdc	760-1070	Dewdney #120*
	Se	1100-1500	Cobble Hill #137
Coast			
QCW Queen Charlotte Is. Wet	Ss	0-450	Lost Lake #142
QCM Queen Charlotte Is. Moist	"	"	" " "
MCM Mid Coast Moist	Ss	0-300	Yellow Pt. #R2
MCW Mid Coast Wet	-		
NCW North Coast Wet	-		
NCM North Coast Moist	Ss	0-300	Yellow Pt. #R2
NST Nass Skeena Transition	Pli	450-900	Nass Skeena Trans. #R6
WCC West Central Coast	Hw	0-450	Lost Lake #126
		450-900	Lost Lake #127
	Cw	0-600	Lost Lake #128
NCI North Coast Islands	-		
NVI Northern Vancouver Is.	Hw	0-450	Lost Lake #126
		450-900	Lost Lake #127
	Ss	0-450	Nootka #118*
	Cw	0-600	Lost Lake #128
Southern Interior			
WK West Kootenay	Sx	<1400	West Kootenay Low #301
		≥1400	West Kootenay High #302
TOD Thompson Okanagan Dry	Sx	1400-1900	Thompson Ok #303
	Pli		Thompson Ok (1.75 gen) #308
			Shuswap Adams (1.75 gen) #307
SA Shuswap Adams	Sx	0-1500	Shuswap Adams Low #305
		≥1500	Shuswap Adams High #306
	Pli		Shuswap Adams (1.75 gen)#307
TOA Thompson Okanagan Arid	Sx	1400-1900	Thompson Ok #303
	Pli		Thompson Ok (1.75 gen) #308
			Shuswap Adams (1.75 gen)#307
EK East Kootenay	Sx		Mica & E. Kootenays #304 (1.5 gen)
MIC Mica	Sx		Mica & E. Kootenays #304 (1.5 gen)
BSH Bush	Sx	<1400	West Kootenay Low #301
		≥1350	West Kootenay High #302

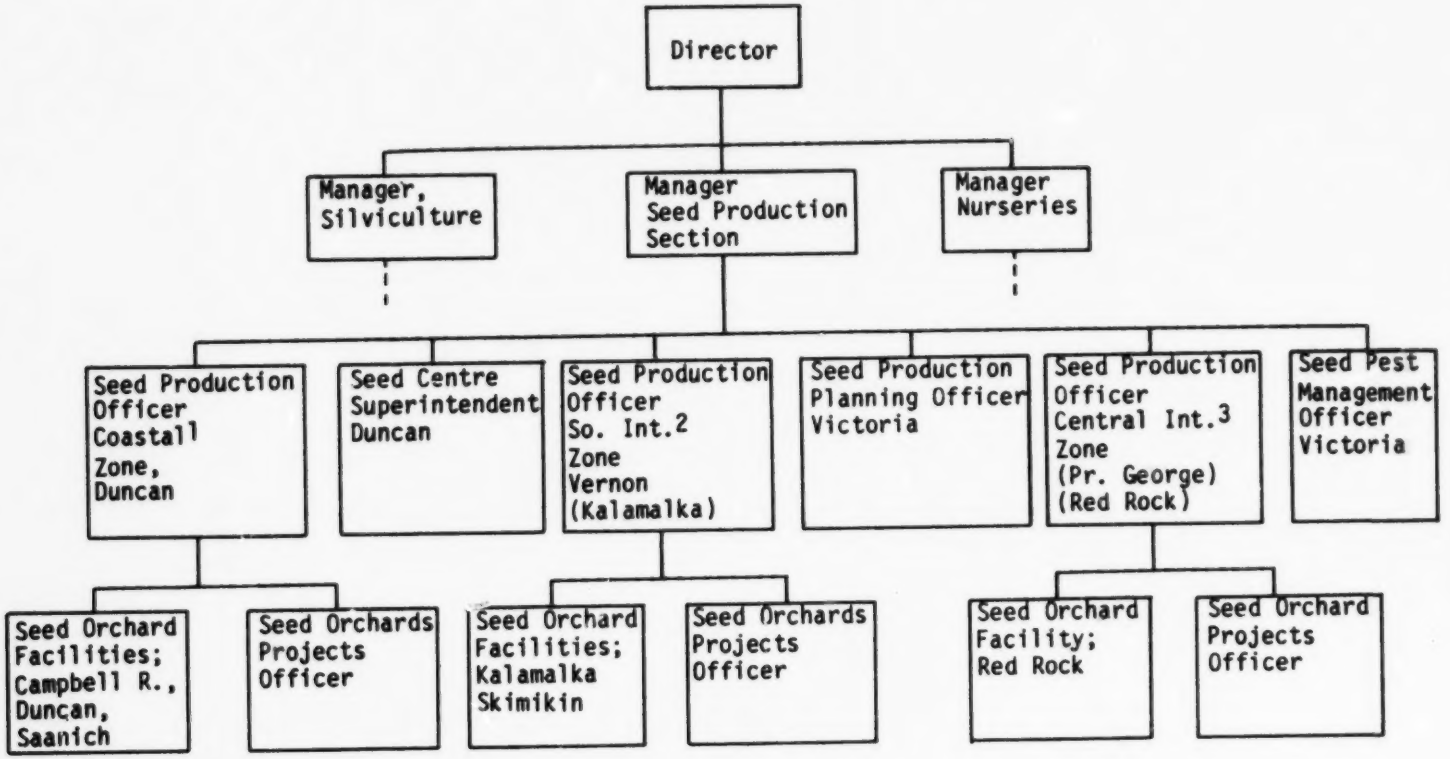
SEED ORCHARD PLANNING ZONE	SP.	ELEV. (m)	SUPPLYING ORCHARD
Central Interior			
CP Central Plateau	Sx	≤840	Central Plateau Low #205
		>840	Central Plateau High #206
		All elev.	North Central (1.5 gen)#217
	Pli	650-1100	Omineca-Pinchi #201
BLK Bulkley	Sx	<840	Bulkley Valley Low #207
		>840	Bulkley Valley High #208
		All elev.	North Central (1.5 gen) #217
	Pli	700-1150	Smithers #204
NCH Nechako	-		
MGR McGregor	Sx	All elev.	Bowron Lks (I) #214
			Bowron Lks (II) #215
	Pli		Willow Bowron #203
			Willow Bowron (1.75 gen)
CHL Chilcotin	-		
CT Cariboo Transition	Pli		Willow Bowron (1.75 gen)
BB Big Bar	-		
QL Quesnel Lakes	Sx	All elev.	Bowron Lks (I) #214
			Bowron Lks (II) #215
			Quesnel Lakes #209
	Pli		Willow Bowron #203
			Willow Bowron (1.75 gen)
MRB Mt. Robson	Sx	All elev.	Bowron Lks (I) #214
			Bowron Lks (II) #215
HH Hudson Hope	Pli	500-1000	Dawson Peace #202
FIN Finlay	-		
DK Dease Klappan	-		
FN Fort Nelson	-		

[1]Missing from list are Harmac orchards (#122, 123, 124, 125), which are not based on planning zones, but on biogeoclimatic subzones of Douglas-fir.

Organization Chart

Seed Production Section

Silviculture Branch


Director
Manager, Silviculture
Manager Seed Production Section
Manager Nurseries
Seed Production Officer Coastal Zone, Duncan
Seed Centre Superintendent Duncan
Seed Production Officer So. Int.2 Zone Vernon (Kalamalka)
Seed Production Planning Officer Victoria
Seed Production Officer Central Int.3 Zone (Pr. George) (Red Rock)
Seed Pest Management Officer Victoria
Seed Orchard Facilities; Campbell R., Duncan, Saanich
Seed Orchards Projects Officer
Seed Orchard Facilities; Kalamalka Skimikin
Seed Orchards Projects Officer
Seed Orchard Facility; Red Rock
Seed Orchard Projects Officer

Seed Orchard Administration Zones:

1. Coastal Zone = Vancouver and Coastal portion of Pr. Rupert Forest Region.
2. Central Interior Zone = Prince George, Cariboo, and interikor portion of Pr. Rupert Forest Region.
3. Southern Interior Zone = Kamloops and Nelson Forest Regions.

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